MONTANA OUTDOORS

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EDITORIAL CREED

To promote the preservation of a livable environment for wildlife, which is a quality environment for man

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MONTANA OUTDOORS

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THE COVER

Wildfires, such as the Trapper Peak fire pictured on the front cover, create life-giving winter ranges for elk, deer and other wildlife. (Photo courtesy of U.S. Forest Service)

Montana's newest game animal, the mountain lion, goes by many names, but they all refer to *Felis concolor*. The one on the back cover was captured on film by Gus Wolfe.

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editorial

THE 1971 hunting season is now almost over. More than 300,000 residents and nonresidents bought Montana hunting licenses so they could take to the fields and forests to feel the magic of the hunt.

Not all brought home game, but chances are they didn't feel slighted. Gone forever is the thinking that hunters *must* bring home some game. A quality outdoor experience, some healthy exercise and a rare chance for peaceful solitude are usually enough compensation for unsuccessful hunters.

The sport also fills a very essential niche in the game manager's toolbox. Without an adequate hunter harvest, many of Montana's game species and especially antelope and deer would spend a long, hunger-ridden winter. However, now that hunters have removed the annual surplus without dipping into the breeding stock, Montana's game populations will, with few exceptions, survive the winter and reach fawning and calving grounds and nesting areas in good physical condition. Nature's game basket will then be filled to overflowing for the next hunting season.

Director Frank Dunkle summed it up when he said, "In Montana, good hunting helps perpetuate good hunting."

But not all is good this hunting season.

On the East Coast, an anti-hunting storm is mushrooming and slowly spreading its misinformation west. A bold-as-brass organization called The Committee for Humane Legislation forms the nucleus of the movement. The committee is headed by Alice Herrington, president of Friends of Animals, Inc., a very outspoken anti-hunting group from New York City.

The committee has proudly circulated its legislative intentions, the first of which is the Ocean Mammal Protection Act—S. 1315 by Senator Fred R. Harris (D-Okla.) and H.R. 6558 by Congressman David Pryor (D-Ark.). The Harris-Pryor bill will cover marine mammals such as fur seals, polar bears, whales, walruses and sea otters with a complete protection blanket, leaving no allowance for scientific management.

Here in Montana, we find it difficult to get terribly excited about the plight of whales or fur seals. But we had better start changing our attitude, because the committee's second move will tear our hunting hearts out.

Their number two legislative goal is a complete ban on hunting, shooting, trapping, poisoning or any other taking of wildlife on all federal public lands.

In Montana, public land makes up one-third of the state and hosts a large part of our total game population. Its possible unavailability takes on doomsday characteristics for Montana hunters.

Among its other literature, the Committee for Humane Legislation has flatly stated that sooner or later it intends to put an end to all hunting.

We can't discount these self-righteous groups. They have already had at least one major victory.

Earlier this year, the Bureau of Sport Fisheries and Wildlife scheduled a hunt by local sportsmen to reduce deer overpopulation and save the existing habitat from overuse in New Jersey's Great Swamp Refuge. The Friends of Animals, Inc. strongly opposed the planned hunt and was successful in obtaining a court injunction to forbid it.

Bob Bell, editor of PENNSYLVANIA GAME NEWS, wrote a blistering editorial on the situation in which he said, "What matter as a consequence a number of deer which would have been harvested cleanly and whose meat would have been utilized as food spent months starving to death so they could rot in their swamp?"

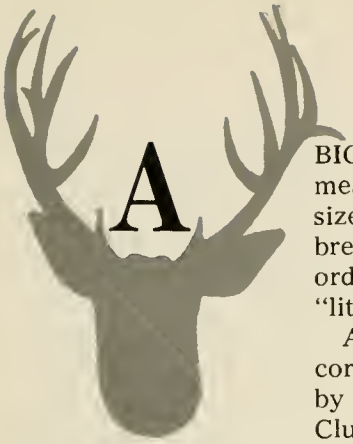
Alice Herrington responded to Bell's editorial with a "no words spared" letter-to-the-editor that appeared in a following issue of PENNSYLVANIA GAME NEWS. She said, in part, "Admit your lust to kill and stop posing as wildlife's benefactor . . . Let's tell it like it is: Hunters are not only paranoid—they are miserable cowards."

Certainly, emotional raving such as this obscures the facts. But don't underestimate the effectiveness of such groups. If they can do it once, they can do it again.

I suggest you write to Alice Herrington and tell her, politely, what you think about a complete ban on hunting. Address: Alice Herrington, Friends of Animals, Inc., 11 West 6th Street, New York, N.Y. 10023.

This goes for anyone interested in the future of outdoor recreation and the quality of the total environment—not just hunters. A ban on hunting would be game management's darkest day and would mean the tragic end to an enjoyable and beneficial form of outdoor recreation.

—Bill Schneider



A BIG BUCK

BY JOE EGAN

A BIG buck to most people means the antlers. It is the size of the antlers that breaks and establishes records and is the basis for a "little bragging."

Antler size is judged according to rules established by the Boone and Crockett Club, a national organization which has set standards for judging North American big game. The criteria set forth by this club, organized in December 1887 by Teddy Roosevelt, serve as guidelines to determine what constitutes a big buck. The Boone and Crockett system calls for making various measurements on the antlers, which are added and/or subtracted in such a fashion that antler growth forms are put into a usable classification.

Boone and Crockett considers the antlers of deer as typical or non-typical. Thus in Montana, where there are two species of deer, there are actually four kinds of big bucks—typical and non-typical mule deer and typical and non-typical whitetails.

Symmetry can be a rather important factor for a set of antlers to qualify for the record book. Some very large antlers without symmetry might not score very high even though they are "bragging antlers."

Despite Boone and Crockett standards, each hunter has his individual definition of a "big buck." There is little doubt that the mule deer ranking Number One in the Boone and Crockett non-typical antler category was indeed a big buck. However, a two-point mule deer can still be a big buck, if it happens to be the one a boy bags on his first deer hunt. Bigness is in the eyes of the beholder.

In the world of sports, records are set to be broken or surpassed, and the key word for competitors is *condition*. The athlete will not set any records unless he is in condition, and a deer will not "set" any records unless it is in condition. Everyone knows how an athlete conditions himself, but there may be doubt or misunderstanding about how a deer becomes a big buck. An explanation of how antlers are formed may help clear up some of this misunderstanding.

In the first place, antlers are not the same as horns. Horns are structures with a bone core covered by a sheath of material called keratin. Montana wildlife with horns are mountain sheep, mountain goat and antelope. Horns are usually not shed, and this rule applies to sheep and goat; however, the antelope, somewhat of a biological oddity, does shed the outer sheath.

Antlers, on the other hand, are in essence an annual growth of bone. They are covered with velvet while growing, are shed annually and are generally branched. Antlers are possessed by male elk, deer and moose.

Deer antlers are grown on the bone pedicels of the frontal (forehead) bone. These bony extensions are often mistaken for beginning antlers in fawns. Antler growth begins when a deer is about 10 months old. There is some variation in antler growth between mule deer and whitetails, as well as variation caused by locality, age and diet.

Antler development is stimulated by the increasing amount of daylight that comes with spring, according to an article by R. C. Lund in NEW JERSEY OUTDOORS (December 1967). Although the following refers to whitetails, it is for the most part applicable to mule deer:

> The normal cycle of antler development begins in early April with increasing periods of daylight. This increased exposure to light stimulates the pituitary, a gland located within the basal area of the skull. The secretions of this gland indirectly

Every hunter looks for trophies like these. In healthy, well-managed deer herds, chances are he will find them. (Photo by Mike Sample)

A BIG BUCK...

stimulate the male sex glands or testes which produce the hormone testosterone. It is this hormone which actually initiates the process of antler development.

During the initial development period, antlers grow very rapidly and the first fork usually appears within a few weeks. If the animal is in good condition, a second fork may appear within weeks of the first. During the entire period of development, antlers are covered with a protective epidermis or velvet. This not only protects the antler, but because it has blood vessels and nerve endings, it also provides the nutrients necessary for growth.

After about two months the antlers have attained their maximum spread, most of the points have been formed and the calcification (hardening) process begins. This process, which starts at the base, will eventually change the antlers to bone. Calcification is nearly complete by the first part of September.

The final stage of antler development coincides with the shedding of the velvet. Again, the hormone testosterone comes into play, perhaps triggered by shortened periods of daylight. The amount of testosterone increases in the blood and completes the hardening process in the antlers. As this occurs, the blood vessels are constricted and are eventually cut off completely, causing the velvet to die. The deer, perhaps to alleviate "itching," quickly removes the velvet by rubbing against brush or other material. Rubbing is continued for several weeks following the loss of velvet as sort of a polishing process.

When we view a little two-point mule deer, the process of antler development does not seem very spectacular. However, when we see a large buck, bull elk or bull moose and come to realize that the process and length of time for growth is almost exactly the same as described in the previous paragraphs, it borders on the incredible!

Many factors dictate the size or extent of antler development. Certainly, age is one. As a general rule, older animals have larger antlers than young animals. A deer in good condition probably produces his finest "rack" after his fourth year. Or, stated another way, a deer is a big buck when he's in his prime.

Heredity might also determine which deer is to become a big buck. In a given population of deer under certain conditions over a period of time, the process of natural selection ("survival of the biggest") may cause big bucks to be more numerous in that area. Studies in genetics and heredity, however, are rather long drawn out processes and generally not something readily usable by the hunter.

Another factor is habitat. All wildlife is a product of and dependent on the habitat in which it lives. Deer are no exception. The quality and quantity of habitat greatly influences every aspect of a deer's development, including antler size. An example to illustrate: antlers from two deer, both the same age, but from different areas, were found to be of different sizes. One deer came from an area of deteriorated winter browse—its antlers were small and spindly. The other deer came from an area where winter browse conditions were far superior—its antlers were considerably larger. Both sets of antlers had the same number of points.

Before a hunter can fully appreciate big bucks, he should know something about the age structure of a deer population. Age structure means how many of the animals are fawns, yearlings, two-and-one-half-year-olds, three-and-one-half-year-olds, and so on.

One thing should be pointed out: antlers are only a general indicator of a deer's age. A four point is not necessarily a four-year-old deer. To find out how old a deer is, you must look at its teeth. The process for determining age, using the teeth as a criterion, is fairly involved and will not be discussed here.

In every healthy animal population there must be more young animals than older animals. This is a biological fact because not every animal born (or hatched) will survive its first year. Loss of young is not related to hunting per se. Death is a natural process; animals are dying all the time and all animals eventually die.

An animal population can be likened to a triangle or pyramid. If there is to be a large population of big bucks (trophy bucks), there has to be a larger population of smaller bucks (sub-trophy bucks). In order to have a larger population of smaller bucks, there has to be an even larger population of fawns. Another biological fact — all young animals must have mothers, which are also members of the population "pyramid." A population consisting mostly of trophy bucks would be a pyramid "standing on its point." Such a pyramid is unstable and would fall over—and the population of deer would do exactly the same. Big bucks make up the smallest segment of a normal, healthy deer population.

Big bucks are, first of all, usually the prime animals; secondly, they will more than likely be found in quality habitat; and thirdly, there just ordinarily can't be great quantities of them.

Deer occur in just about all parts of Montana.

Some areas, to be sure, may favor a larger deer population than others or more whitetail than mule deer, but in most localities of Montana, the ingredients for a big buck are present. There are no cookbook instructions for bagging a big buck (or even a little buck for that matter), and even though some big bucks have been taken with little effort on a first hunt, the trophy comes to those who work at it.

Escape areas are of prime importance in a big buck's haven. Such areas can be brushy islands for whitetail, gumbo breaks for muleys, or other features of the landscape into which the deer can run to prevent the hunter from getting the jump on them. The hunter will have to know the "lay of the land" if he is to understand where his quarry is likely to go and what it is likely to do. About the only way to learn the lay of the land is to physically go to the chosen area and systematically cover it. Knowledge of the habits of deer can be acquired by repeated observation supplemented by reading.

Much opinion exists as to how actual hunting should be undertaken. One method will probably be as successful as another, but trophy hunting requires extensive use of field glasses or spotting scopes. "Glassing" an area should be systematic and unhurried. An area cannot be possibly be "overglassed." Big bucks have been observed lying perfectly still with neck and head outstretched, depending on protective coloration to conceal them, and more often than not, the hunter without field glasses or spotting scopes didn't know there was a deer in the country.

Sometimes big bucks sneak out of a patch of woods behind the hunter. Many hunters spend too much time walking and not enough time looking. That fact holds true no matter what kind of game is being hunted. It's tough for a hunter to get within range of a wily whitetail when he is literally crashing through the brush. Few big muleys will be taken by surprise by a hunter who sounds like a bulldozer crossing a talus slope. The noisy hunter who doesn't utilize the natural concealment of the vegetation and the topography will get the impression there are no big bucks within a "hundred miles" of where he is hunting, and in a sense he is probably correct.

Deer are pretty much tied to a specific area or home range. They are born and they live and die in their home ranges. These home ranges are not large—two or three square miles for whitetail, perhaps two or three times that large for mule deer. The hunter should note where he observes deer because the respectable buck he saw in 1969 or 1970 might just be a trophy in 1971—and it won't be too far from the 1969 or 1970 location.

If you remember these basic rules while you are hunting that big buck, your chances of bringing home a trophy might be better than the next fellow's. This is important in a sport as challenging and as potentially rewarding as hunting.

	F&G	District	Number of Trophies
TYPICAL MULE DEER	1:	northwestern Montana	7
	2:	western Montana	8
	3:	southwestern Montana	7
	4:	central Montana	4
	5:	Billings, Montana	3
	6:	northeastern Montana	6
	7:	southeastern Montana	3
NONTYPICAL MULE DEER	1:	northwestern Montana	1
	2:	western Montana	5
	3:	southwestern Montana	7
	4:	central Montana	2
	5:	Billings, Montana	2
	6:	northeastern Montana	1
	7:	southeastern Montana	1
TYPICAL WHITETAILS	1:	northwestern Montana	9
	2:	western Montana	1
	3:	southwestern Montana	1
	4:	central Montana	1
	5:	Billings, Montana	0
	6:	northeastern Montana	1
	7:	southeastern Montana	3
NON-TYPICAL WHITETAILS	1:	northwestern Montana	5
	2:	western Montana	1
	3:	southwestern Montana	0
	4:	central Montana	2
	5:	Billings, Montana	0
	6:	northeastern Montana	4
	7:	southeastern Montana	0

This breakdown of the distribution of trophy bucks in Montana appeared in the October 1970 issue of MONTANA OUTDOORS (the predecessor of the publication you are now reading). Ken Greer's article "Do You Own a Trophy?" lists the trophy records for Montana up to 1969. The top antlers in the state came from the areas listed above.

EDITOR'S NOTE: Joseph L. Egan, 44, Assistant Chief of the Game Management Division in Helena, has worked for the department since 1952. In June of that year he was graduated from Montana State University, Bozeman, with a Bachelor of Science degree in fish and wildlife management. He returned to obtain a Master of Science degree in the same field in 1957. Before taking his current post, Egan served as Game Biologist and District Game Manager in Miles City and as District Game Manager in Bozeman.

JERKY eight ways

Make this old-time favorite in your own home · by Louise Fenner

JERKY is man's answer to the tough old buck. It is meat—often the tough cuts of game or beef—that has been sliced into long narrow strips, seasoned and cured by drying. In the frontier days, jerky fed the Indians and pioneers, the fur traders and the cowboys. Now hunters, campers and hikers chew jerky for energy and college students wash it down with beer.

Many western families make their own jerky —it costs only a fraction of the store-bought version and it turns tough pieces of meat into a tasty snack. The varieties are endless. Some people dry their jerky in the sun, others use the oven, and still others smoke cure it.

Since a "standard" recipe for jerky doesn't exist, we chose eight versions that include all three methods of drying and a wide assortment of seasonings. Most can be made with either beef or game meat. We hope you will try some.

SUN-DRIED JERKY

The pioneers and Indians made jerky by hanging it on wires or string and drying it in the sun. Of course, this is best tried during the warmer months.

Cut beef or game meat with the grain into strips 1 inch wide, ½ inch thick and 6 to 12 inches long. Place the strips in a salt brine consisting of 2 pounds of salt dissolved in 6 quarts of water and leave for two days. Remove meat from brine, wipe dry and hang it in sun to cure. This may be done by threading the meat onto a heavy twine or wire, spreading the pieces apart so that the sun and air can reach them. Cover loosely with cheesecloth to keep flies off. When the meat is dry, the pieces may be stored in a dry cool place that is protected from dust or insects.

Note: the recipe didn't indicate how long the meat should hang. A similar recipe recommended three days.

Venison: Field Care and Cooking
Utah State Division of Fish and Game

JERKY SUN-DRIED IN A BOX

Partially freeze three pounds of lean beef, deer, elk or moose flank or round steak and slice into ¼-inch-thick strips about 6 inches long. Remove as much fat as possible.

Combine:

1 tbsp. salt
1 tsp. onion salt
1 tsp. garlic salt
¼ tsp. pepper
⅓ cup Worcestershire Sauce
⅓ cup soy sauce
⅓ cup meat sauce

Place the meat strips in this sauce in a strong plastic bag, removing as much air as possible from the bag. Secure bag with rubber band and lay it flat in shallow pan. Marinate in refrigerator 24 hours, turning bag several times. Then pour off marinade and dry meat on paper towels.

To dry in sun, lay meat strips on oven racks without overlapping. Place racks over a large box which has been lined with foil; cover with one layer of cheesecloth and securely fasten edges of the cloth to box with clothespins to keep out insects. Bring in at night. (Length of time to dry: see note for preceding recipe.)

To dry in oven, a gas oven pilot light will

dry jerky in about two days. When meat is brittle and chewy, store in a covered jar.

Virgil Witschey of Sultan, WA
Fishing and Hunting News

SUGAR CURE SMOKED JERKY

Choose meat of long grain so the pieces will be chewy. Bottom round, shoulder meat and flank steak are good. Cut meat into strips approximately ¼ inch thick and ½ inch wide. Cut with the grain in pieces as long as possible. (Partially freezing the meat makes it easier to handle.)

You can make your own curing salt (see recipe below) or use a prepared mix. I prefer Morton's Sugar Cure. To make jerky more peppery tasting, add 1 oz. white pepper to each 3 pounds curing salt. Instead of this you might want to try 1 oz. cayenne pepper per 3 pounds of salt to make it even hotter. Rub the salt on the meat and let it sit in a cool place (refrigerator) overnight. Don't let it freeze or sit in too warm a room.

Next, hang the meat in your smokehouse or lay it on racks—CAUTION: USE NONGALVANIZED RACKS TO AVOID FOOD POISONING. Here is how I smoke the jerky: using alder or chokecherry wood in an iron fry pan over my heater (a double-burner electric hot plate), I bring the smokehouse to 150 degrees and turn the heat off. The meat begins to dry and smoke condenses on it. When the smokehouse is cool, I give the meat a second smoking by bringing the temperature up to between 120 and 150 degrees. I retain this temperature and check the meat occasionally by cutting through a thick piece to see if it is dried throughout.

When the meat is dry (it takes from 3-5 hours), I let it stand in the smoker overnight and cool slowly so smoke will condense on it to add flavor. The jerky will have a deep red, rubbery look and will be dry, yet chewy, all through. It should be stored in a cool place out of the sun.

Note: although an old refrigerator makes a good smokehouse, one built of two-by-fours with 3½-inch-thick walls works better. The heat is easier to hold and control in all types of weather.

HOMEMADE DRY CURING SALT
FOR 50 POUNDS OF MEAT

Mix: 1 pound salt
2½ pounds white sugar
6 oz. Prague powder or salt petre
For hotter salt, add:
1 oz. white pepper
or
1 oz. cayenne pepper

Don Malmberg
Helena, MT

SALTED SMOKE CURED JERKY

Any type of wild game can be jerked. Remove all fat and connective tissue possible from meat. Slice into strips approximately 1/8 to 3/16 inch thick, 1 inch wide and 6 inches long. If the meat is tender, slice with the grain. If it is tough, slice across grain.

Combine: 2 pounds fine salt
7 oz. Lawry's Seasoned Salt
1 oz. garlic salt
1 oz. white pepper

Use Lawry's Salt container as a shaker to put jerky salt on the meat.

Sprinkle jerky salt on one side of each piece. Put a little more salt on the meat than you normally do, but don't oversalt. Place the strips of meat in a crock, enameled pail or plastic bucket with the salted side up and let stand for 12 to 24 hours. Do not rinse meat.

Place meat on trays in a smokehouse at 150 to 180 degrees with a non-resinous wood (chokecherry, apple or any fruit wood) for approximately 8 hours or until meat reaches desired smoked taste and dryness.

Most people like their jerky with a little moisture—in this case, it should be removed from the smoker before entirely dry. This moister jerky must be stored in a freezer or it will mold. Jerky can be dried until it is hard. This can be stored without refrigeration.

Jim Ford
Bozeman, MT

OVEN-DRIED VENISON JERKY

I asked Mrs. Fliger how long her jerky would keep. She doesn't know because it is always eaten as fast as she can make it.

3 pounds fresh venison
liquid smoke
salt mixture: 2-3 tbsp. salt, 1 tsp. brown sugar, ½ tsp. garlic salt, 1 tsp. Alpine Touch)
fresh coarsely ground pepper

Jerky can be made from scraps of meat left after butchering—use the pieces you would ordinarily grind up for hamburger. Any tough cuts also make good jerky—just partially freeze the meat and then slice it into thin strips or chunks across the grain.

Put salt mixture on one side of meat, brush other side with a very little liquid smoke. Stack the meat in alternate layers in a flat pan, a salty side against a smokey side. Place another pan on top and weight it down to press out meat juice. Let stand overnight.

(continued on page 31)

These men learned about frostbite the hard way.

This 19-year-old man received a first degree frostbite injury when snow drifted into his gloves while he was skiing at -45°F. His injury is marked by swelling, redness and tenderness of the fingertips.

A 20-year-old man received this second degree injury to the ears while walking in freezing weather. The temperature was -3°F. and the wind velocity 15-25 mph. He was exposed for 25 minutes. His head covering consisted of a cotton earband. Earbands are inadequate, as they restrict the blood flow into the ears and provide insufficient insulation against the wind and low temperatures.

Photos courtesy of U.S. Air Force

a few things you should know about

FROSTBITE

by don malmberg

This 20-year-old man was attempting to start a metal cook stove at -17 to -43 F. He was wearing two pairs of gloves, a tight-fitting and constricting combination. He finally completed his task after removing the gloves. The result was second, third and fourth degree frostbite with the loss of the tips of two fingers. His errors were wearing constricting clothing and working on metal objects with bare hands at sub-zero temperatures.

This 47-year-old trapper put on four pairs of socks and rubber boots and proceeded to walk his trap line from 8 a.m. to 11 p.m. During the day he noted no pain or numbness. Upon removal of his boots, he found that his toes were white, cold and hard. This photo is the appearance of his foot 20 days later. Amputation of two toes was necessary because of fourth degree frostbite.

After a drinking bout, this 22-year-old man wandered around all night at sub-zero temperatures wearing no gloves. This is the appearance of his second degree frostbitten hands two days later. Fortunately, there was no tissue loss.

WINTER is upon Montana once again, and with it come long, cold nights and sub-zero temperatures. Certain medical problems accompany the low temperatures of Montana's winter, and chief among them is the threat of cold injury and frostbite.

This article intends only to briefly show what frostbite can do. The prevention is up to you.

What is frostbite? Actually, it is the freezing of tissue—tissue such as skin, muscle, bone and even nerve. The water between and within the cells is changed to crystals. These ice crystals tend to draw water out of the cells, thereby increasing the injury. Much of the injurious effect of frostbite is caused by damage to capillary blood vessels which bring oxygen and nutrients to the tissues.

When frostbite affects only the surface layers of tissue (as in first and second degree injuries), it may be entirely reversible; but when the deep layers of tissue are involved (third and fourth degree injuries), there may be extensive tissue loss and gangrene.

It must be emphasized that the freezing of tissue is not a painful process, although sometimes there may be a little tingle. When cold, painful fingers, ears or toes stop hurting, they may be frostbitten. Often the victim is not aware that frostbite is occurring. The best advice offered by winter survival experts is: never travel alone. You and your partners can then check each other periodically to see that your nose and ears are not white.

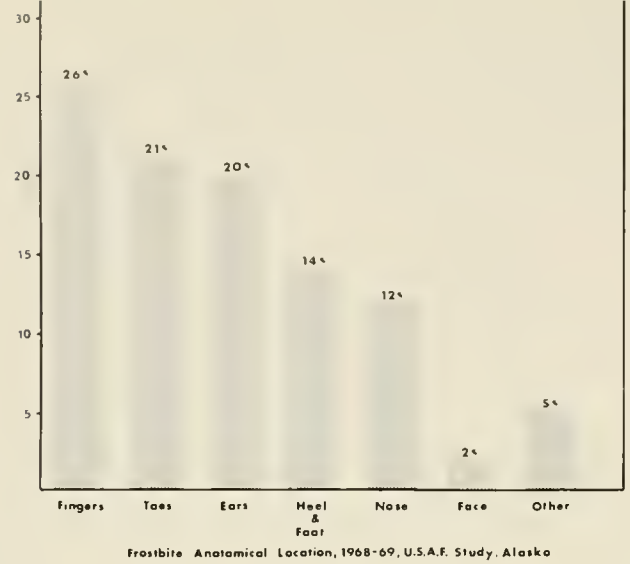
What is the treatment? Minor degrees of "frost nip" on the nose or ears can be warmed by body heat or by coming indoors. However, real frostbite requires careful treatment.

Ideally, frostbite is best treated in a hospital. A suspected frostbite victim should get to a hospital as soon as possible in order for his physician to evaluate the severity of the injury. Prior to reaching professional care, the frozen part should be protected against further injury. AVOID massage, excessive heat or application of additional cold and salves.

What must be done if frostbite strikes a victim who is in a remote spot far from medical aid? This is not an easily answered question since specific circumstances must be taken into account.

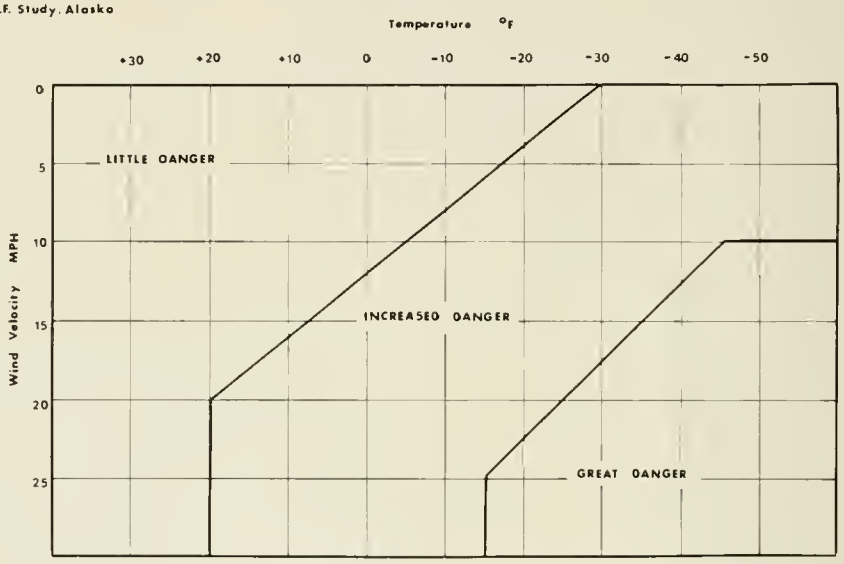
On some occasions, it may be best to leave a frozen part as it is instead of thawing it until

EDITOR'S NOTE: Don A. Malmberg, 41, is Project Leader for the department's Law Enforcement Division in Helena. Last year he attended an Air Force-sponsored winter survival training course in Miles City, which furnished much of the information for this article. Malmberg formerly served on a Navy reconnaissance team as a deep sea diver. He worked part time for the department's Game Management Division while attending the University of Montana, Missoula, and joined the department full time in 1960 after obtaining a Bachelor of Science degree in wildlife technology.



Frostbite Anatomical Location, 1968-69, U.S.A.F. Study, Alaska

This bar graph shows the location of body areas most frequently injured during a typical year. Note that the extremities are most frequently frostbitten.



When should we have a fear of frostbite? The wind chill chart (right) is based on the time it takes for exposed human flesh to freeze at a particular temperature and a particular wind speed. The lower the temperature and the greater the wind velocity, the faster flesh freezes.

FROSTBITE

safety is reached. Walking on a recently thawed foot produces extensive mechanical damage. Besides, a person can walk to safety on a frozen foot but he may be unable to walk if the foot has been thawed. The danger of refreezing also exists, and there is evidence that refreezing a recently thawed part produces very marked damage, often requiring major amputation. Thus, it may be necessary to risk the damage that may occur with prolonged freezing if one's life and the chances of reaching safety hang in the balance.

In conclusion, it is important that winter recreationists understand the dangers inherent in cold temperatures. A few simple rules will help you avoid becoming a frostbite victim. They are:

1. *Clothing should be clean.* Dirty, sweaty clothing does not conserve body heat as well as clean clothing because air pockets which normally trap and retain warm air near the body become clogged.

2. *One should avoid overheating by removing top layers of clothing during heavy exercise or higher temperatures.* Otherwise, the clothes may become sweaty and subsequent evaporation of water as they dry will lower the body temperature.

3. *Clothing should be loose and dry.* This will prevent constriction of blood vessels and loss of body heat through evaporation of moisture.

4. *Handling metal in sub-zero temperatures with bare hands should be avoided.* In freezing weather, the moisture in the hands may freeze on contact with the cold metal.

5. *Avoid the use of alcoholic beverages when out in sub-zero temperatures.* Alcohol can cause loss of body heat.

Remember, with careful thought and common sense you will easily be able to enjoy Montana's winters in safety.

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The Other Half

. . . A Woman's Look at Conservation by Louise Fenner

SOMETHING FOR THE COOK

"My folks homesteaded in the Crazy Mountains in 1910 and from then on it was survival off the land and streams and the animals and gardens that we raised. I am enclosing a standby recipe that was on our calendar every year.

VENISON BUTTERFLY STEAKS

"Strip out loin from backbone of deer. Remove all fat. Proceed to cut into 3-inch hunks—there won't be too many, but don't skimp! Place loin, muscle-side-down, on cutting board and cut into the center of each piece until almost through the meat. Press out flat and you will have a butterfly steak.

"Prepare a marinade of the following: 1 cup vinegar, 3 cups water, 1 tbsp. salt, dash of pepper, 1 bay leaf, 1 tbsp. brown sugar. Bring to a boil and then cool. Place meat cuts in a pan that will not crowd the meat and cover with marinade. Let stand overnight in cold place or refrigerator.

"One hour before cooking, drain off liquid. Roll meat in pancake or biscuit flour and fry in bacon grease or butter (being careful not to burn). Cook about 30 to 45 minutes, or until tender and golden brown.

"A 'must' with chokecherry syrup and pancakes . . . cook lots because they're SO good."

Mrs. John B. Conne
Oak Harbor, WA.

We hope other readers will also contribute their favorite recipes. Please mail them to: MONTANA OUTDOORS, Fish and Game Department, Helena, MT 59601.

THE LADY OR THE TIGER?

The ocelot, the leopard, the jaguar, the tiger, the cheetah—what do they have in common? They are all in trouble.

These spotted (and striped) cats have the bad fortune to be beautiful. An estimated one-half million of them are killed every year for their exquisite fur. Most of the consumers are women, and so they are partly responsible for the sad fact that several of these exploited species are on the verge of extinction.

No one knows quite how serious the trouble is. Leopards and tigers are almost extinct in several countries and are declining in others. Jaguars and ocelots are becoming scarcer, and even the cheetah is diminishing.

Fortunately, America and Britain are beginning to heed the conservationists' warnings. The U.S. Endangered Species Program forbids importation of skins which are declared endangered in the country of origin, and several states are taking additional protective measures.

Best of all, the furriers and fur buyers themselves are demonstrating a new consciousness. The Furriers Joint Council, representing 99 per cent of America's fur workers, will not use skins taken from animals threatened with extinction. In England the International Trade Federation has declared a similar ban. Several world renowned furriers have refused to handle skins of imperiled species. Vogue, McCalls and other women's magazines have taken a stand against the use of rare wildlife pelts and are promoting furs of ranch-raised or population-controlled animals.

"Fake fur" is becoming a popular substitute and a conscience soother. Besides synthetics, real furs such as white ranch mink are being stencilled with markings of leopards, zebras and tigers. Just recently a mutant mink was perfected with dark spots on white fur that strongly resemble jaguar markings. Coats made from it run about $2,500 to $3,500 less than the real thing.

As hopeful as this trend sounds, it is far from enough. Europe generally seems to be indifferent to the problem and still supplies a tremendous market for spotted and striped cats. Some experts estimate that only one to 10 per cent of these animals are hunted legally, while the rest fall to poachers who are lured by the overseas market. Laws protecting cats are hard to enforce when the territory they encompass includes thousands of miles of Amazon jungle or African bush.

The irony is that the spotted cats, which are being brought to the brink of extinction, make up only a minute portion of the fur industry's sales—only one per cent. Completely prohibiting the use of these animals would hardly make a dent in the fashion industry.

The great cats' extinction would not touch many Montanans directly . . . so why should we worry about it? Because any animal's disappearance, let alone one so splendid and beautiful as a leopard or cheetah, will make the earth a little more barren. To have only a spotted coat to show for their loss is almost too absurd—and too painful—to contemplate.

by Keith Seaburg

So, what's a watershed?

MUCH of America's most precious natural resource, the soil, is draining into rivers and streams, lakes and oceans. In many regions, watersheds bare of vegetation allow more water to drain off the land than nature intended. This is a serious problem — how serious it will become in the future depends on the practice of good watershed management now.

A watershed is a region draining into a small stream, river, river system, lake or other body of water. Its natural purpose is to allocate part of the moisture it receives to runoff, percolate (soak gradually) part into the ground and return a portion back to the atmosphere.

Watersheds come in all shapes, sizes and colors. Some are like a sponge, some like a furry rug and other like a slick but dirty bathtub. Most drain the runoff water in a dendritic pattern like veins in some leaves. Some streams draining a watershed assume a meandering pattern similar to a snake's path in sand. Other streams, because of hard rocky outcroppings, pour down in tumbling cascades.

The size of a watershed depends on our frame of reference. It can be as small as the East Fork of the Bitterroot or as enormous and widely encompassing as the Columbia River watershed.

Geological happenings which took place thousands of years ago cast the basic watersheds and predetermined many of their characteristics. The elevation, direction, slope and soil types of watersheds are inherited characteristics, just as real as animal genetics. Most are changed slowly by the cutting action of running water. A notable exception was the gigantic slide in the Quake Lake area (near Yellowstone Park) in which part of a mountain was dislodged, radically altering vegetation, flow pattern and other characteristics of the original watershed.

Although the natural weathering or aging of a watershed is predetermined, man's activities often have pronounced effects on the hydrologic process of metering or allocating its supply of water. By man's action, erosion is accelerated or reduced, ground percolation is increased or reduced, and the water runoff rate and volume can be affected tremendously.

HOW A WATERSHED WORKS

An inch of rain or its equivalent in snow puts 113 tons of water on each acre of land. The inherited makeup of the watershed, plus what man has altered, determines what happens to that water. The object of Nature's hydrologic game is to catch water where it falls and tame its tons of energy.

Many studies have been done on the insoak or percolation processes that occur in watersheds. Archer and Brunch in "The American Grass Book" state that " . . . *one thousand acres of good grassland will provide a reservoir of water in the soil equal to a* 1000*-acre detention dam.*" Tests in Illinois demonstrated that *rain dropped on grassland soaks in* 22 *times faster than on intensively cultivated soil.* Soils covered by some forests absorb even more water. In New Jersey where there was a need to dispose of surplus water, the *wooded lands absorbed* 50 *inches in* 10 *hours. Some spots absorbed* 100 *feet of water in a year.*

Not all of the moisture falling on forested or brushy watershed falls to the ground. Some is intercepted on leaves or needles and returns in vapor to the atmosphere. However, a walk in the woods after a rain or snow should convince anyone that only part of the intercepted moisture evaporates. The water that runs down heads, necks and shoulders probably would have eventually reached the ground.

Forest cover not only reduces the amount of water reaching

the ground, it delays the impact of those tons of precipitation and meters it out more slowly. This factor of interception seems to be an important one in the Black Hills of South Dakota. Prior to the era of manned fire watches, pumper tanks and bulldozers, fires periodically scorched the hills, killing most trees and leaving room for the fast growing grasses. Doghair (small, even-aged) stands of ponderosa pine now block the route General Custer took through the Hills with his supply wagons enroute to his ill-fated mission near Hardin, Mont.

In the very early days the Black Hills watershed supported an estimated 1200 miles of trout streams. Present day figures tally a mere 200 miles. Interception of rain and snow and transpiration of soil water (evaporation into the atmosphere from the pores of leaves) by the dense growths of trees seem to be the causes for this decline.

No intensive hydrologic studies have been done in Montana relating to the effects of forest cover on water yield, but such studies in Idaho and Colorado are revealing. *The water equivalent of the snow pack increased more than four inches* (452 *tons per acre*) *when all of the forest cover was removed* from a portion of the Priest River Experimental Forest in Idaho. The average annual runoff in a Colorado watershed increased by one-fourth when 39 per cent of the drainage was clearcut of timber. Unknown and unshown is information about recharge (adding to existing levels) of the deeper ground water through insoak. Here the watershed's legacy of soil type, elevation, direction, slope and climatic conditions determines how dramatic the change.

The key to long-term overall benefits of watershed management is in the maintenance of vegetation so that surface runoff is minimal and low in energy. As vegetation increases, whether from rest-rotation grazing, fertilization, contour furrowing or forestry practices, the porosity of the soil increases and insoak (percolation) quickens. It is a beautiful cycle and it affects everything — water supplies, deer, elk, moose, birds, insects and bacteria. For instance, young game birds need higher protein food during the period of rapid growth than vegetation can supply. The complex of insects nurtured by improved vegetation provides this high protein diet for the young birds.

Animal distribution maps quickly demonstrate an association with water courses. A watershed functioning in accordance with its inheritance provides clean water for fish and the associated complex of bacteria, algae and insects.

The percolation of water through soil into streams is less erosive than surface runoff since the soil has absorbed the gravitationally induced energy. In addition, percolating water enters streams cooler in the summer and warmer in the winter than runoff, thus acting to make stream temperatures more moderate. This aids fish, snails, clams, insects and other organisms whose life processes proceed at a rate dictated by water temperature. Extremes in temperature cause stress to these creatures, and those least affected by the extremes will take over. Fish such as carp and bullheads usually remain.

A small tributary in Oregon is a prime example of forestry practices affecting stream temperatures. This small stream warmed 17 degrees in a mere 1300 feet of travel through a clearcut area, where the moderating effect of percolation and shade had been reduced to a minimum.

THE PROBLEM

The hydrologic cycle is easily changed by man's activities. Thirsty states, in an effort to bleed more yield from a watershed than nature intended, often convert forested watershed from low runoff yield to a higher yield grassland and perhaps ultimately to a watershed of steel, concrete or asphalt. However, hidden costs and dangers lie in wait for such simplistic single-use-oriented projects. Changes such as these and lack of good watershed conservation practices have created an erosion problem in America.

One indication of the magnitude of the watershed problem is the silt deposited at the mouth of the major rivers. For example, the annual volume of land soup (silt) oozing past New Orleans each year is estimated at about one cubic mile. Dr. H. H. Bennett, former chief of the U.S. Soil Conservation Service (SCS) estimated in 1951 that 117 million tons of fertilizing elements were lost annually through erosion, whereas cropping and grazing removed only 19 million tons.

Not all the land soup ends up going by New Orleans and other river ports. The National Water Resource Council reports that *at the present rate of siltation, "The reduction in storage capacity of the nation's reservoirs decreases by one million acre-*

Improved watershed management practices can put the reins on the rapid loss of our most valuable natural resource, soil.

watershed...

feet per year." (An acre-foot is one acre in size and one foot deep.) In Eastern Montana, engineers estimate that the annual sediment yields from watersheds range from 13 to 17 acre-feet per section of watershed. *At those rates a reservoir containing 100 acre-feet of storage receiving runoff water from 10 sections of land (10 sq. miles) would fill with sediments in 14 to 33 years.*

The Public Land Law Review Commission (PLLRC) report entitled "One Third of the Nation's Land" estimates that "58 per cent of all major stream sediment loads in the 11 western states are contributed by public lands. Most of these high-sediment-yielding lands are managed by the Bureau of Land Management." In fairness it should be pointed out that the Bureau inherited many pieces of land still in shock from years of overgrazing, plowing and drought.

Unfortunately, government agencies seem unwilling to spend much money for watershed conservation practices. The PLLRC report estimates that about 2¢ per acre per year is allocated for improvement of watersheds in 11 western states.

"At the actual rate of spending reported by the agencies," the report said, "it will take 100-200 years to accomplish the watershed conservation measures reported to be needed on U.S. Forest Service and National Park Service units. At the present rate of expenditure it would take the Bureau of Land Management 60 years to achieve its goal."

Can we wait 100-200 years or even 60?

WHAT CAN BE DONE?

Our past performance in stewardship of the land engenders a mood of pessimism. But much can be done. The singular objective is to establish and maintain adequate vegetative cover. While they are debatable from an aesthetic or economic standpoint, forbs ("weeds") and sagebrush hold the soil and trap the water as effectively as alfalfa or ponderosa pine. The tools to revegetate these watersheds exist. Solid granite, sheer cliffs or alkali soils may be the only exceptions.

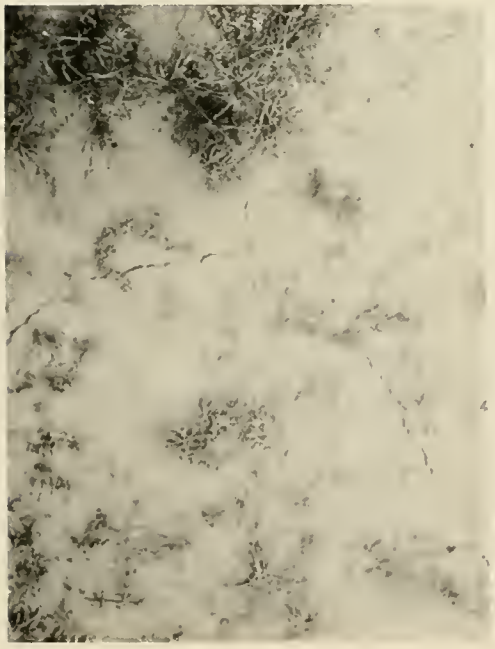
One method of establishing vegetative cover is to free the land from continuous annual grazing. Gus Hormay of the Bureau of Land Management, a 30-year pioneer in rest-rotation grazing systems, has most of the answers. His grazing system is simply based on the needs of the plant. First, a fenced series of pastures must be established, usually three or more. For one of the three pastures the desirable grazing sequence would be as follows: 1972 — graze all season, 1973 — no grazing, 1974 — grazing late season only. Each of the other pastures takes a turn in the rotation. The resulting improvement in vegetative cover is nothing short of amazing and equally amazing is the fact that *under rest-rotation the number of grazing animals often can remain the same or be increased.*

The Bureau of Land Management is setting up rest-rotation grazing systems as fast as funds and time permit. The photographs from the Verle Pierce allotment west of Alzada, Mont., show the startling changes in the vegetation in just a few years. The initial photograph (1968) shows the effects of continuous no-rest grazing even after livestock numbers were reduced. With rest-rotation the livestock numbers have actually been increased.

The Bureau of Land Management is sponsoring another study carried out by the Agriculture Research Service in an area near Ekalaka, Mont. Nearly barren hard pan soils are treated with contour furrows in an attempt to increase insoak and density of vegetation. Some of the desired information is still inconclusive

Before and after shots showing the effects of planned rest-rotation grazing. The left photo was taken in 1968 after years of overgrazing. The right photo was taken in 1971 after four years of rest-rotation grazing. This watershed is now wisely managed and probably produces just as many or more cattle than it did before 1968. (Photos courtesy of the Bureau of Land Management)

When used correctly, contour furrowing adds considerable vigor to a watershed. Only the background of the above photo is managed by contour furrowing. Compare it with the bare hard pan soil in the foreground. (F&G photo by Keith Seaburg)



A close-up of the foreground of the above photo. It was taken just west of Ekalaka, Mont. Hard pan soils can't be subjected to overgrazing without resulting in conditions similar to those shown here. Barren soil like this sets the stage for rapid runoff of precipitation which, in turn, causes erosion and siltation of nearby streams. (F&G photo by Keith Seaburg)

because the program was only begun in 1967, but increased plant vigor and lack of runoff are impressive. Soil moisture has increased. Runoff has occurred in only one of several contoured areas, and this was in the spring of 1971. These areas, as the photographs show, are hard-baked pan spot soils where traditional thinking tells us little can grow. But even the hopeless has promise if some interest and energy is turned to the problem. Montana can use more promise.

The contour furrows break up that hard, seemingly lifeless baked soil so that water can soak into the more porous lower soils. Given time, the root systems of each plant will provide an avenue for insoak.

The first step in improving vegetation in watersheds, especially in short precipitation areas, is to defeat the traditionalist idea that nothing will grow in those areas. Bare soil is an unnatural condition, vegetated soil is the natural scheme.

It is intolerable to see the most precious segment of our natural resource, that of soil, lost in less than one man's lifetime. Soil buildup is a natural phenomenon, massive soil loss unnatural. Soil loss is criminal.

There is only one answer — most water must be stopped where it falls, and vegetation does it.

EDITOR'S NOTE: Keith G. Seaburg, 46, is the department's District Supervisor in Miles City and a former District Information Officer in Missoula. He is also a member of the American Fisheries Society. Seaburg has served as fish research biologist for the Minnesota Conservation Department, water pollution biologist for the Minnesota Health Department, and as district fish manager for the South Dakota Department of Game, Fish and Parks. He has a Bachelor of Science degree in fish and wildlife management, obtained in 1951 from the University of Minnesota, Minneapolis-St. Paul.

THE CATCHALL

by Bill Schneider

a break for the breaks

Of all the meandering miles of the mighty Missouri, only one large section remains unimpounded, undeveloped and unspoiled—a 175-mile stretch between Fort Benton and the Robinson Bridge in Montana.

Partly lined by the famous Missouri River Breaks, this portion of the upper Missouri has almost unlimited recreational potential. Hunting, fishing, boating, floating and hiking are only a few of the many possible recreational uses.

Senator Lee Metcalf (D-Mont.) has sponsored legislation (S. 1405) that would establish a Missouri Breaks Scenic Recreation River on this, the last free-flowing stretch of the Missouri.

If passed, the bill will authorize the Secretary of the Interior to declare portions of the river "wild" (free of impoundments), "scenic" (undeveloped but accessible) or "recreation" (readily accessible). In addition, the bill will name the Bureau of Land Management as administrator, stipulate that current grazing allotments be continued, provide for development of camping and other recreation, continue hunting and fishing and provide for flexibility in management.

To date, there have already been three public hearings on the possible effects of the bill. At all three there was some opposition. Most disagreements came from water users interested in proposed dams on this stretch of scenic river.

Anyone tracing the Missouri's length from Three Forks to its junction with the Mississippi should come up with the same observation—this river has already been dammed to death. This historic, free and natural section of the Missouri should be left as it is today—a wild and scenic river, something very rare in this country.

Let's give the Breaks a break.

NEW LAW FOR EAGLE KILLERS

As a result of the recent killing of more than 500 bald and golden eagles in Wyoming and Colorado, new legislation has been presented to Congress that would considerably stiffen the penalty for such unlawful acts.

Congressman John D. Dingell (D-Mich.) and 11 co-sponsors introduced the Bald Eagle Protection Act (H.R. 10450) to haunt those who would needlessly slay the bald eagle—the nation's symbol—or its cousin, the golden eagle.

If passed, the act will provide for a fine of $5,000 or one year imprisonment for first offenders and $10,000 or two years for second offenders. Every eagle killed would constitute a separate offense under this legislation.

The destruction of the majestic and ecologically valuable eagle is an inexcusable crime against our environment and an insolent breach of the federal law that protects it.

When introducing his bill, Congressman Dingle put it very bluntly and accurately when he said, "This callous disregard for the law must be halted."

MORE ACTION NEEDED

Of the 1.8 million acres that have been disturbed by strip mining in this country, only 56,000 have received any reclamation treatment. It would appear that more action by state and federal agencies is in order.

JUST FOR THE BALD?

The National Wildlife Federation (NWF) recently announced that it will pay $500 to anyone who supplies information leading to the conviction of any person killing a bald eagle.

The NWF used the term "bounty" in its offer. However, since the word has such bad connotations in game management, I side stepped it in the paragraph above. This is, however, one "bounty" that conservationists will support everywhere.

Although the bald eagle is in more danger of extinction than its regal cousin, the golden, the reward could easily be expanded to include both species. In fact, many people feel the golden eagle is more noble and awe inspiring than the bald and should have been named the national bird.

The reason it wasn't is that the bald eagle's range is confined to North American while the golden resides in the entire northern hemisphere. It's only just that the nation's symbol be a truly American bird.

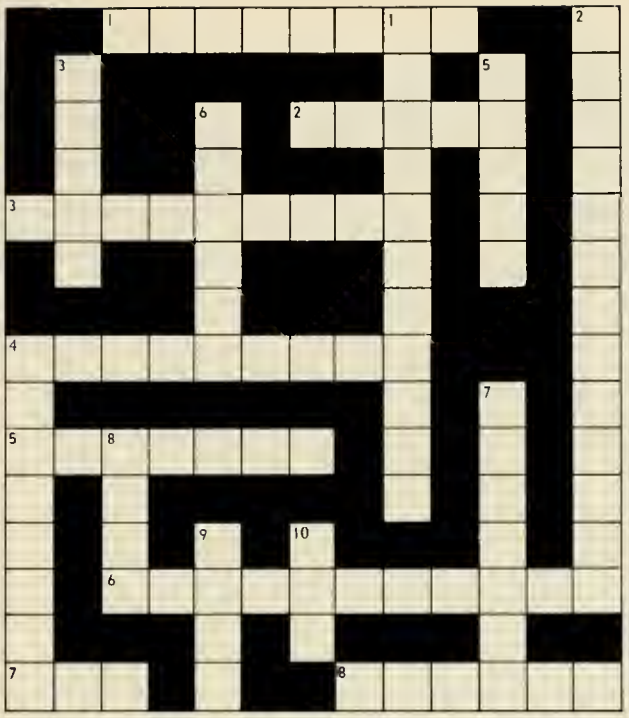
Even though a $500 "bounty" isn't offered, I hope that anyone who knows of the killing of federally protected golden eagles will report it.

POLLUTION TAXES

A coalition of environmental organizations has proposed an unique form of pollution control.

It has asked President Nixon to use pollution taxes to control damage to the environment. If the discharge of waste pouring into our atmosphere and water were taxed, environmental degradation would become economically unfeasible. Thus, polluters would have an added incentive to clean up their operations.

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION
(As required by 39 U.S. Code, Section 4354.) MONTANA OUTDOORS is the official publication of the Montana Fish and Game Department. All materials and goods contributing to its publication are owned by the department. Publisher—Montana Fish and Game Department, 125 Roberts, Helena, Montana 59601. Editor—Bill Schneider, same address. Frequency of issue—six times each year, January, March, May, July, September and November. Number of copies printed in the past 12 months—119,000. Number of copies printed for this issue—19,000, of which 8,595 are paid circulation. Extra copies are offered free to other publications on an exchange basis and to schools, libraries and other similar groups, and sold individually by department personnel, at district offices, on newsstands and in certain sporting goods stores. Entered as second class mail in Helena, Montana 59601. Additional entry in Bozeman, Montana 59715.



ACROSS

1. condition often associated with severe frostbite that may require amputation of affected parts.
2. elk cannot survive without adequate winter .
3. freezing of human tissue.
4. a region draining into a small stream, river, river system, lake or other body of water.
5. mountain lions cannot be hunted without a .
6. the gradual soaking of water through the soil.
7. a big game animal that would easily overpopulate its range if it were not harvested annually.
8. another name for Montana's newest game animal.

DOWN

1. the hunter is needed to harvest surplus deer and antelope in certain hunting districts.
2. this process hardens antlers into bone.
3. one- of Montana is public land.
4. early day created huge natural game ranges.
5. the part of a deer's anatomy that is the most reliable indicator of its age.
6. annual growth of bone on male deer, elk and moose.
7. controlled is one of the most effective methods of creating new winter game ranges.
8. act of bravery in Indian culture.
9. Aleck - chea - ahoosh was chief of this tribe.
10. female deer.

wildlife shorts

The legs of loons are so far back on their bodies that they can't walk on land.

* * *

Hummingbirds are the only birds in the world that can fly backwards.

* * *

A half ton of earthworms can easily live in one acre-foot of good soil and turn over 20 tons of earth each year.

* * *

A beaver can remain under water for 15 minutes.

* * *

The whistling swan has more feathers than any other bird—25,216 in all.

* * *

The mother's milk of a doe deer contains three times the fat and protein of a Jersey cow's.

* * *

Antelope fawns can run up to 25 miles an hour when only two days old.

* * *

Butterflies taste their food with the soles of their feet.

* * *

A deer can jump an eight-foot fence from a standstill and leap as far as 30 feet on the run.

* * *

All members of the dog and cat families (domestic and wild) are digitigrade, which means they walk only on their toes. Their heels never touch the ground.

* * *

Young robins consume an average of 14 worms daily.

* * *

The meadowlark, our state bird, is not a member of the lark family. It belongs to the blackbird and oriole family.

* * *

Bear cubs weigh less than one pound at birth.

* * *

The bat is the only mammal capable of true flight.

book reviews

THE MONTANANS' FISHING GUIDE, by Dick Konizeski. Mountain Press Publishing Company, Missoula, Montana. 1970.

Volume I — MONTANA WATERS WEST OF CONTINENTAL DIVIDE. 325 pp.

Volume II — MONTANA WATERS EAST OF CONTINENTAL DIVIDE. 359 pp.

Each volume — $3.95 paperback, $6.95 cloth.

The completion of the two volumes of *The Montanans' Fishing Guide* marks the successful conclusion of a Herculean effort by Dr. Richard Konizeski, professor of forestry (hydrology) at the University of Montana, Missoula. Only a person with a deep love for Montana fishing would have undertaken the task and only someone with unbounded energy could have completed it. Obviously, Dr. Konizeski has both.

Individual waters are arranged in each volume by drainages and listed alphabetically within each drainage. There is at least a short paragraph on every fishing water worthy of consideration. Included are instructions on how to reach it, the type of water it is and a description of the fishing offered.

A work of this magnitude inevitably has some inaccuracies. For example, the list of fish present in some waters is not completely correct. Then, too, as time passes conditions in many waters will change. Nevertheless, the books for the most part accurately describe fishing today. Persons using the guides should be sure to check current fishing regulations.

The guides contain lead articles on each of the main rivers and Glacier National Park, contour maps of many of the more important lakes, and color pictures of a number of game and sport fishes found in Montana. Excellent photos are interspersed throughout the two volumes. Both guides are well printed and easy to use. Dr. Konizeski's style makes delightful reading. The advice given is the sort usually only obtained from an old fishing buddy. These guides are well worth the price to anyone who is more than casually interested in fishing Montana waters.

—George D. Holton

LAND USE AND WILDLIFE RESOURCES. National Academy of Science, Washington, D.C. 1970. 262 pp. Available from: Printing and Publishing Office, National Academy of Science, 2101 Constitution Ave., Washington, D.C. 20418. Paperback, no price listed.

Land Use and Wildlife Resources is essentially a broad assessment of the impact of current agricultural practices. The study, undertaken at the request of the U.S. Department of Agriculture, was made by the National Academy of Science.

Two general objectives are: 1. evaluation of the interrelations between agricultural land use and the production of wildlife and other natural resources; 2. examination of areas of apparent conflict between agricultural and wildlife management objectives. The book attempts to discover what might be done through cooperative research, education, extension and regulatory programs to resolve these conflicts.

Unlike many publications written by committees, *Land Use and Wildlife Resources* is very readable and informative. Of particular value and interest to the nonprofessional are chapters 1, Historical Perspective, and 2, Wildlife Values in a Changing World, both written by Durwood Allen. Several other well-known scientists contribute additional chapters on the many aspects of the picture. The authors explain that details of fisheries management, pollution as such, and pesticides are omitted because of already existing in-depth studies currently available to the reader.

The book avoids any suggestion of piecemeal resource approaches; it argues that low-level resource planning will inevitably continue and magnify past errors; and it points out the immense value of wildlife, including its immeasurable social value.

Further comments on brushlands management, bird and animal damage control and protection of waters and watersheds are pungent and to the point. "Total" development of river systems is termed a misbegotten concept. Areas of sparse population are described as essential counterbalances to huge megalopolises for many persuasive and documented reasons.

Land Use and Wildlife Resources should not be overlooked by anyone who values the quality of his environment, regardless of its location.

—Bob Carroll

MONTANA FLORA

AND WHAT IT MEANS TO WILDLIFE

CHOKECHERRY

Chokecherry is a large shrub or small tree found along water courses and moist hillsides up to 8,000 feet. The leaves are one to four inches long with tooth-like serrations along the edge. When in bloom, chokecherry is covered with corn-dog shaped white flowers. When fall arrives, chokecherry leaves are among the first to change color.

A member of the rose family, chokecherry is widely known for the excellent jellies and wine made from its berries.

Chokecherry is also used extensively by wildlife. Pheasants, grouse, wild turkeys and many non-game birds eat the berries and some leaves during the fall. Black and grizzly bears also dine on the ripe berries. Members of the deer family browse on chokecherry stems and buds during winter.

In spring and early summer, chokecherry leaves can be poisonous, especially to livestock.

—Harley Yeager

Long, lithe, elusive, beautiful and powerful

The MOUNTAIN

Photo by Danny On

LION

by Dave Wedum

"To be seen at the Greay Hound Tavern in Rexbury, a wild creature, which was caught in the woods about eighty miles westward of this Town, called a Cattamount, it has a Tail like a Lyon, its Leggs are like a Bears, its claws like an Eagle, its eyes like a Tiger, its countenance is a mixture of every Thing that is Fierce and Savage, he is exceedingly ravenous and devours all sorts of Creatures he can come near; its Agility is surprising, it will Leap thirty Foot at one jump notwithstanding it is but Three months old. Whoever inclines to see this Creature may come to this place aforesaid, paying a Schilling each, shall be welcome for their Money."

READING chronicles of times past, such as this account in the Boston Gazette of 1738, one would tend to believe that the forests and prairies of the American frontier were teeming with fierce, predatory beasts. The "beast" described above is a mountain lion, *Felis concolor* (meaning cat of one color)—the newest addition to Montana's game animal list.

The mountain lion has been variously called cougar, catamount or "cat of the mountains," brown tiger, red tiger, purple panther, black panther, silver lion, American lion, deer killer, Indian devil, king cat, puma, panther and painter.

Perhaps the most widespread mammal of the Americas, the mountain lion ranges from Patagonia at the southern tip of South America, through Central and North America, to the Peace River and Cassiar districts of northern British Columbia including Vancouver Island. In the United States, the mountain lion's principle distribution is west of the 100th Meridian in the forested areas of the Rocky Mountains and West Coast states and the desert areas of Texas, New Mexico and Arizona. Historically, the lion's range in the United States extended from coast to coast and border to border. Lions have been reliably reported in 47 of the 48 contiguous states. Florida is the only state east of the Mississippi definitely known to have lions presently, although persistent reports of their occurrence still come out of Maine, upstate New York and the southern Appalachian Wilderness.

Lean and lithe, with a short tawny or reddish-brown coat, the mountain lion is the Americas' largest unspotted cat. Adults may range in size from less than 100 pounds to more than 200 pounds, with the largest reliably recorded weight being a 227-pounder taken in Colorado by Theodore Roosevelt in 1901. A giant, weighing 276 pounds dressed weight, was reportedly taken in Arizona, but details of this are quite sketchy.

As is the natural instinct of all cats, mountain lions will retreat to the treetops when pressed with hunting dogs. Hunting lions with dogs is the only way the new game animal can be taken with any measure of success. It's a sport that demands superb physical condition. Often dogs and hunters will trail a lion for several days before it trees. This involves taking a sleeping bag and rolling it out wherever you are when night falls. (F&G photo by Dave Wedum)

A mountain lion kitten. New regulations protect any mountain lion young enough to still have baby spots. (F&G photo by Dave Wedum)

The MOUNTAIN LION...

An animal of astounding strength and endurance for its size, a lion is capable of producing a stunning impact with its entire weight upon its prey. Often it will leap on its prey from above, knocking it down and delivering a final killing blow. Deer seem to be favored victims in most areas, particularly in winter, but lions will eat almost anything from grasshoppers to elk, depending upon the availability of food.

Lions find most of their prey in the rougher, more inaccessible canyons that also provide habitat in which they can live and breed with the least disturbance.

Mountain lions have no set breeding season, with the birth of young having been reported at all times of the year. One to five spotted kittens are born to a litter, with two or three being the most common numbers. The young remain with the mother, most often until they are nearly two years of age. During this time they go through a training program on the killing of their prey species.

Dr. Maurice Hornocker of the Idaho Cooperative Wildlife Research Unit conducted what is probably the most intensive research on the mountain lion. He reports numerous instances in which single kittens have accompanied the lioness on hunting forays, but no instances in which the entire litter has gone. Hornocker feels this is primarily because the lioness "can better train one kitten at a time in the techniques of hunting and killing deer and elk."

After making a kill the mother will fetch the other young to the site. If left undisturbed, they will remain until the entire carcass of the prey is consumed.

ECOLOGICAL VALUE

The ability of lions to kill deer and elk, as well as their predation upon domestic livestock, led to a continued persecution of the species and the virtual extinction of the animal over most of its North American range. For many years it was believed that the elimination of larger predators such as lions would result in a corresponding increase in the number of game animals in an area. The fallacies of this thinking have been demonstrated many times. Data from Hornocker's study show that lion predation was not limiting the elk and deer population (in the Biggs Creek area of central Idaho), but that winter food supply was the most important factor limiting their numbers.

Hornocker goes on to say, "Lions also keep deer and elk moving on the winter range, thus distributing them more evenly on restricted range and reducing local overuse of the vegetation. In an ecological sense, therefore, the influence on surviving animals is tremendously important. Predation by lions in our study area clearly benefits mule deer and elk populations."

A GAME ANIMAL

Increased awareness by game managers and conservationists of the ecological role of the mountain lion has resulted in changes in the status of the lion in many western states over the past few years.

The big cats, which drew a bounty in Montana until 1963, were reclassified from predators to game animals by the 1971 legislature. Consequently, a license is required to hunt them and definite bag limits and seasons are set.

Montana residents must possess a valid Conservation License in order to apply for a lion permit from the Helena office of the Fish and Game Department. Nonresidents must have a $151 General Big Game License in order to apply for a lion permit.

The season will open along with the general big game season and will run through April 30 of the following year. Only one lion per license year per person is allowed. No females accompanied by young may be taken, nor is it legal to take juveniles young enough to still have body spots.

Since the lion is a trophy animal, hunters are not required to use the meat. Only the skin and skull must be kept. These must be presented to a fish and game warden or office for tagging within 10 days of the kill, and evidence of sex of the animal must remain on the hide. As with grizzly bears, the skull will be retained by the Fish and Game Department for processing and examination and then will be returned to the owner.

Little is known of the distribution or abundance of mountain lions in Montana; but with continued study of accumulating data, it should be possible to preserve this magnificent animal for generations to come.

EDITOR'S NOTE: David E. Wedum spent the winter of 1965-66 in an Idaho primitive area, participating in a mountain lion study conducted by Dr. Maurice Hornocker, leader of the Idaho Cooperative Wildlife Research Unit in Moscow. The still-continuing study is the most comprehensive investigation of the mountain lion to date. Wedum, 32, is now Fish and Game District Information Officer in Great Falls. He joined the department in 1967 as Educational Representative after working for the U. S. Forest Service and the Soil Conservation Service. He has also worked as a packer and guide. Wedum was graduated from the University of Montana, Missoula, in 1964 with a Bachelor of Science degree in wildlife technology, a teaching certificate in biological science, and minors in sociology and economics.

Photo courtesy of the Montana Historical Society.

CHIEF PLENTY COUPS

" . . . These are my people here today, I am their chief, I will talk for them. I would like to see all of them supplied with wagons, plows, mowing machines, and such farming implements as they may need. I understand that the money obtained by leases is used towards purchasing these things. That is a good plan . . . I want the men who have cattle here on the Crow lands to employ half Crow and half white-men to work their cattle . . . I want them to make them work and teach them the whiteman's ways so that they may learn . . ."

Aleck-chea-ahoosh

THE preceding paragraph is an excerpt from a Billings Gazette (Montana daily newspaper) article of March 27, 1890, quoting Aleck-chea-ahoosh, last and perhaps greatest Crow Indian chief. Translated into English, Aleck-chea-ahoosh means "Many Achievements," or as it was more commonly translated into the language of the day, "Plenty Coups."

Chief Plenty Coups saw many sudden and drastic changes come to himself and his people—from the abolition of a free nomadic life to an unnatural existence in the white man's world.

Coups (pronounced coos) were acts of bravery. So, as Plenty Coups' name suggests, he was a great warrior with more than 100 coups to his credit. However, his claim of being possibly the greatest of all Crow chiefs probably stems from his efforts toward acculturation of his people —that is, learning and accepting the white man's ways necessary for Indian survival in a new environment. He was reputedly the first Indian on the Crow Reservation to seriously take up farming. His apple orchard, a portion of which productively survives today, was a great source of pride to him, as was his two-story log home, the first two-story Indian home on the Crow Reservation (located in south central Montana near Billings).

by Ron Holliday

Plenty Coups' efforts were widely recognized during his own time, as evidenced by the following portion of a 1915 letter to the chief from Cato Sells, Commissioner of Indian Affairs:

> I want to congratulate you upon the good influence which I know you are having among the Crows. Your personal example is good and they look to you for advice and influence. I was greatly pleased with your home and farm conditions. I wish every Crow Indian would emulate your example and do as you are doing in this respect.

The government relied upon Plenty Coups' advice and testimony regarding matters pertaining to the welfare of his people. Many honors were bestowed upon him, culminating in his being chosen in 1921 to represent all Indians of America in the Burial of the Unknown Soldier Ceremony at Arlington National Cemetery in Washington, D.C.

During this or perhaps another of his several trips to the nation's capitol, Plenty Coups visited George Washington's home at Mount Vernon, which then as now was open to the public as an historic site. It was there the chief conceived the idea of leaving his home and land to the public as a park and recreation area. He did this in a

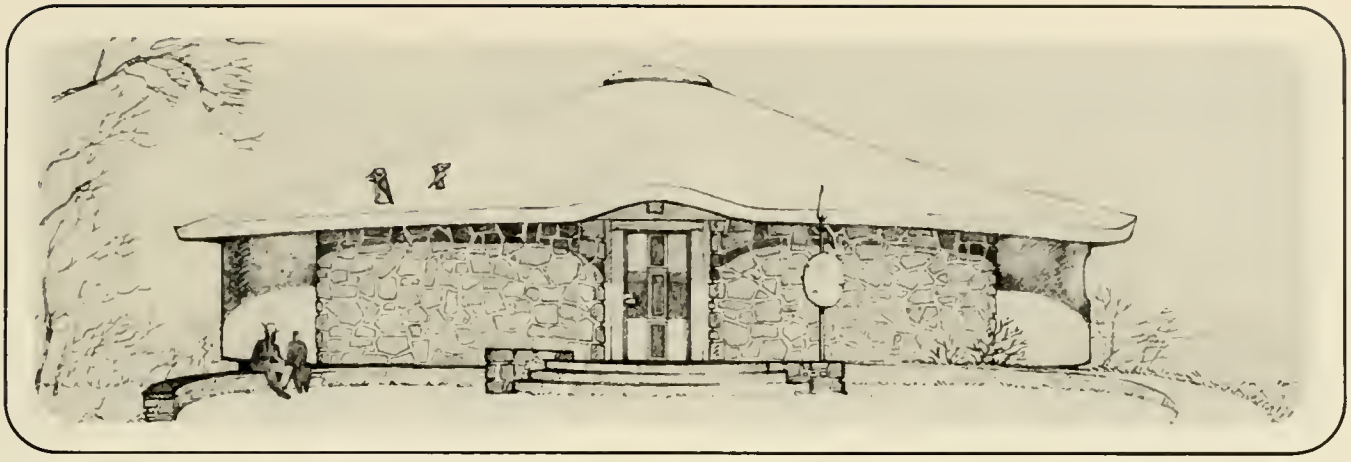
Aleck-chea-ahoosh . . .

formal ceremony at his home in 1928, four years before he died at the age of 84.

The park and recreation area dedicated by Plenty Coups is now classified as a state monument and is under the jurisdiction of the Fish and Game Department's Recreation and Parks Division. It was placed in the trusteeship of Big Horn County following the chief's death, and in 1951 was transferred to the Billings Kiwanis. The Parks Division of the State Highway Department assumed trusteeship in 1961. On July 1, 1965, the State Parks Division was transferred to the Fish and Game Commission where it remains today.

Steady improvements have been made to the area since 1965. A new access road, parking areas

Albert I, Prince of Monaco, presents Chief Plenty Coups with a Model 95 Winchester rifle (date—approximately 1913). The interested onlooker on the left is William F. Cody, also known as Buffalo Bill. The rifle will be displayed at the new visitor center presently under construction.



An architect's conception of the visitor center that is scheduled for completion in 1972. It will contain several interpretative displays on the history and culture of the Crow Nation.

and picnic and sanitary facilities were constructed in 1969 after a state legislative appropriation from the Long Range Building Fund was matched by the federal Land and Water Conservation Fund. The chief's home has been extensively repaired and partially restored to conditions existing in the early 1920's. Two portions of the banks of Pryor Creek, which runs through the area, have been armored with heavy rock rip-rap to curtail severe bank erosion.

As is the case with all land-based areas in the state parks system, all operations and maintenance money for this area comes from direct legislative General Fund appropriations—the department's only use of Montana's tax monies. Although appropriations have been relatively small in the past, gradual improvements in maintenance of the area have been made so that today picnickers and other visitors find a clean, well-kept area.

One of the most pressing needs of the monument was a museum sufficient to house the relics left by the chief and to properly interpret Crow tribal history to the public. Local interests, with assistance from the state legislature, made this dream a reality.

Ed Kopac, a long-time Hardin resident, donated $25,000 toward construction of a building with the provision that it be matched with at least an equal sum. The Crow Tribe met the challenge with a $25,000 contribution, followed by the 42nd State Legislature's contribution of $60,000 from the state's Long Range Building Fund. Building construction began in late July and an opening date is scheduled for early summer of 1972.

The museum, or more properly called the visitor center, will house many of the chief's personal items, including the medicine bundles which he felt gave him power and a good deal of personal correspondence and other papers. The visitor center will also permanently display several excellent paintings of the Crow people which were donated by Mr. Kopac.

With these items and future donations, the story of the Crow people, through the life and deeds of Chief Aleck-chea-ahoosh, will be told. This is as the chief would have wished, for he said in his 1928 park dedication speech: "This park is not to be a monument to me but to the Crow nation. It is given as a token of my friendship for all people."

EDITOR'S NOTE: Ron G. Holliday, 27, is stationed in Billings as District Recreation and Parks Manager for the eastern half of the state (F&G Districts 5, 6 and 7). He accepted the post in 1968 after receiving a Master of Science degree in park and recreation administration from Colorado State University, Fort Collins. Prior to that he obtained a Bachelor of Science degree in physical education and recreation from Rice University, Houston, in 1966. Holliday, who is helping set up Plenty Coups State Monument, has done extensive research on the Crow chief and his people.

CHIEF PLENTY COUPS STATE MONUMENT

LOCATION AND NOTES

Chief Plenty Coups State Monument is a 195-acre plot located approximately 35 miles south of Billings on the Crow Indian Reservation, one mile west of Pryor off State Highway 416.

Because of the monument's relatively small size, its heavy day use and the need to preserve the intrinsic character of the area, overnight camping is not allowed. A spacious picnic area is fully developed with tables, grill, sanitary facilities and drinking water.

A visitor center displaying interpretive materials relating to the history and culture of the Crow Indian, as well as personal relics of Chief Plenty Coups', is scheduled for opening in early summer of 1972.

Does Montana need nonresident hunters? What do they do for our game populations? Should nonresident hunting be abolished? curtailed? increased? Here are some answers.

nonresident hunting

by harley yeager

"GAME shortages are caused by too many nonresident hunters coming into our state and shooting our game!"

"Nonresident hunters are to blame for poor landowner-sportsmen relations. They cut the fences, litter and fire at anything that moves!"

"Nonresident hunters are generally good hunters. They ask permission to hunt and usually bag their game!"

"Out-of-state hunters help the state's economy!"

The preceding comments are typical of Montana residents' conflicting views toward nonresident sportsmen. "Which views are right?" you might ask. Let's take a closer look and find out.

First of all, an apparent lack of game in any area may not be a shortage at all. Elk and deer can be extremely difficult to find in lowland areas during the fall, but when winter storms cover up forage in higher elevations, lowlands suddenly become alive with animals. Furthermore, one hunter can go into an area and find lots of game while another will not see any. Some hunters are better at their sport than others—and maybe luckier.

Some Montana hunting districts have shown a decline in deer or elk populations over the years. Repeated overuse of critical winter range is often the reason. This results in animal die-offs during winter and spring and fewer young animals surviving after birth.

Elk have been forced out of some hunting areas because of excessive human-caused disturbances such as road building, logging, mining and similar activities. Still other hunting districts have lost wildlife populations because of changes in land use—for instance, a change from grassland areas to grain fields or from brushy areas to feedlots.

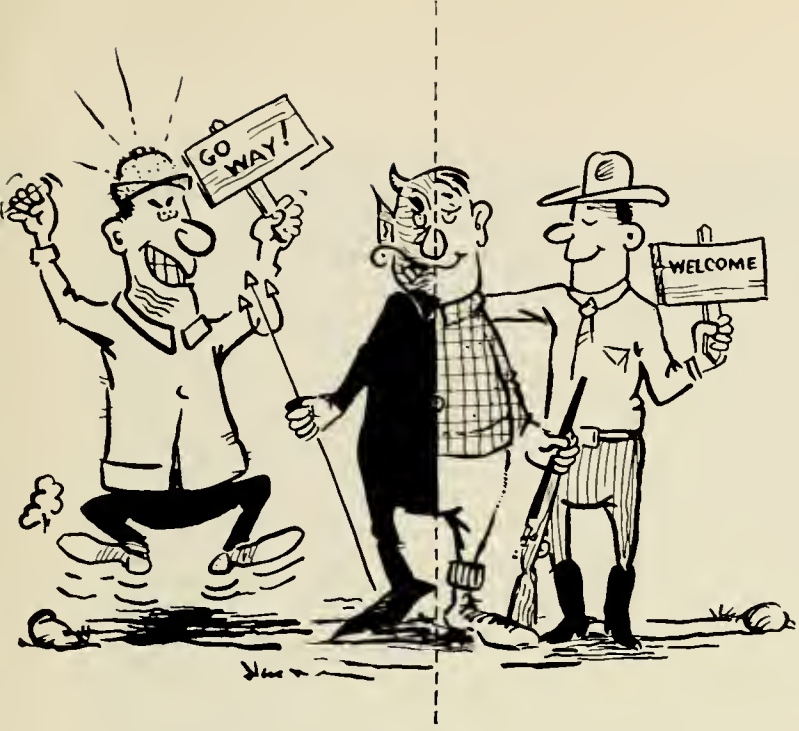
Statewide, annual hunter harvest figures do not show that Montana has any apparent game shortages (see accompanying table, page 30). Such shortages, if they did exist, would result in reduced harvests.

In contrast to game shortage, overabundance of deer and antelope is a problem in hunting districts where too few residents hunt. Underharvested herds inevitably damage their natural food, sometimes to the point that the overbrowsed plants die. The animals are then forced to look for other food. Unfortunately, the farmer's or rancher's haystack is sometimes on the emergency menu. The result is often agricultural damage and starvation or near-starvation of the game.

In order to help harvest the extra animals, a law was passed by the 1955 Montana Legislature providing for $20 special licenses (now $35) for nonresidents to hunt deer and/or antelope in certain areas designated by the Montana Fish and Game Commission. In hunting districts where the problem of excessive numbers of deer or antelope has been corrected or nearly corrected, $35 nonresident deer and antelope permits have been greatly reduced or are no longer issued. *In other hunting districts, poor range conditions and a lack of resident hunters necessitate continued use of nonresidents for the needed harvest.*

A common but unverified complaint about nonresident hunters is that they cause bad landowner-sportsmen relations. Statistics are not available to show whether nonresident hunters are more or less courteous than resident hunters, whether they cause the landowner more or fewer problems than the resident, or whether they commit more or fewer game violations. However, of the landowners contacted by this writer, most have been very pleased with the conduct of the nonresident hunter.

EDITOR'S NOTE: Harley W. Yeager, 34, is the department's District Information Office in Billings. He received a Bachelor of Science degree in fish and wildlife management from Montana State University, Bozeman, in 1962 and has completed one year of graduate work in the same field. Yeager has been with the department since 1958, working as a student game biologist in Great Falls and as biologist for a Yellowstone Park elk research project. Before taking the Billings position he was District Information Office in Glasgow.



Following the 1955 hunting season, landowners in eastern Montana were contacted in regard to holders of nonresident $20 special deer or antelope permits. They were almost unanimous in declaring that the nonresident is, in general, more courteous and considerate than the resident hunter. The check also showed that the nonresident hunter is more successful in bagging his game than the resident. Unfortunately, not all nonresident hunters are courteous, not all are good hunters and not all obey the game laws; but the same generalities apply to residents.

Montana's nonresident hunters must comply with more restrictions to hunt than residents. With the exception of those in certain $35 nonresident antelope or deer hunting districts, Montana's guest hunters must comply with the state's guide law. Another regulation limits the number of sheep, moose, goat and antelope permits allowed nonresidents.

Through the purchase of licenses, nonresident hunters and fishermen furnish a large portion of the Montana Fish and Game Department's budget. Except for a small general fund appropriation for the Recreation and Parks Division, no state monies are allotted to the department—it operates with funds derived primarily from resident and nonresident fishing and hunting license sales.

License sales in Montana help determine the amount of federal financial aid the department receives. Money that comes from a federal tax on sport firearms and ammunition, and a 10 per cent federal tax on sport fishing equipment, is divided among participating states on the basis of land area and license sales. Beginning this year, a manufacturer's excise tax on handguns will also be apportioned to the states.

Nonresidents spent $2.1 million for Montana hunting and fishing licenses during the 1969-70 license year. This figure represents 57 *per cent of the department's total license sales for that year.*

The state's economy also benefits from the yearly influx of nonresident sportsmen. The most recent economic survey on hunting and fishing in Montana was taken during the 1960-61 license year and shows that nonresidents hunters and anglers spent $8.8 million on goods and services in the state. The survey shows that the average nonresident sportsman spends $157 per year in Montana. By using this figure ($157 should be considered as a minimum amount because of inflationary trends during the 1960-70 period), *it can be estimated that* $20 *to* $23 *million was spent by Montana's guest sportsmen during the* 1969-70 *season.* This amount does not include the $2.1 million spent on license fees.

It appears that a lot can be said about the value of Montana's nonresident sportsmen. However, it's no secret that if some residents had their way, nonresident hunting would be severely curtailed or eliminated altogether. Let's explore the ramifications of this idea.

. . . *The elimination or severe reduction of nonresident* $35 *deer and antelope permits would only add to an already existing problem of too many animals in hunting districts where these permits are issued.*

Still, nonresidents do not "hog" all the game, for they take only a small percentage of the annual statewide harvest. During the 1969-70 hunting season, nonresidents accounted for 15 per cent of the deer harvest and 18 per cent of the elk harvest. They accounted for only 16 per cent of the deer harvest and 11 per cent of the elk harvest during the 1970-71 season. In contrast to the amount of game they take, nonresidents pay the largest share of Montana's hunting and fishing license fees.

. . . *The department has a responsibility to allow nonresidents the opportunity to hunt on public land.* If this is not allowed, the matter may be taken out of the department's hands with a very undesirable result.

To illustrate the point, one of the recommendations of the Public Land Law Review Commission as reported to the President and Congress stated, "A federal land use fee should be charged for hunting and fishing on all public lands open for such purposes." The report further recommends, "State policies which unduly discriminate against nonresident hunters and fishermen in the use of public lands through license fee differentials and various forms of nonfee regulations should be discouraged."

MONTANA'S BIG GAME HARVESTS — STATEWIDE

1947 - 1970

Year	Deer	Elk	Moose	Antelope	Mt. Goat	Mt. Sheep	Black Bear	Grizzly Bear	Totals
1970	110,500	14,000	520	17,500	350	70	1,050	28	144,018
1969	102,800	12,100	460	14,500	330	70	1,700	33	131,993
1968	99,300	16,000	460	11,500	330	70	1,950	20	129,600
1967	88,600	14,500	430	12,600	390	70	2,100	30	118,720
1966	98,100	12,400	520	13,900	480	80	1,950	45	128,480
1965	90,140	7,660	440	18,630	342	73	1,080	30	118,400
1964	107,366	11,247	480	27,000	430	70	1,655	115	148,363
1963	119,300	11,050	590	22,240	510	80	1,085	35	154,890
1962	125,000	12,200	610	23,000	480	80	1,300	40	162,710
1961	129,100	15,500	530	19,300	330	70	1,790	60	166,700
1960	122,000	10,100	440	15,000	400	55	1,460	30	149,485
1959	120,300	15,300	410	15,700	240	60	1,480	60	153,550
1958	116,600	12,200	470	14,000	460	70	1,060	40	144,300
1957	134,600	12,800	340	14,400	410	60	680	20	163,310
1956	100,500	11,700	280	22,800	220	40	390	20	135,950
1955	100,000	14,400	270	26,000	130	30	—	—	140,830
1954	84,300	13,400	140	20,000	50	40	—	—	117,930
1953	80,000	13,200	200	22,000	80	20	—	—	115.500
1952	53,800	6,400	210	18,100	50	0	—	—	78,560
1951	39,000	14,600	90	8,200	70	0	—	—	61,960
1950	38,300	11,300	60	7,700	40	8	—	—	57,408
1949	32,400	9,500	60	3,800	30	8	—	—	45,798
1948	29,500	9,600	50	2,800	40	2	—	—	41,992
1947	25,600	7,600	70	2,800	—	0	—	—	36,070

nonresident hunting...

Approximately one-third of Montana's 147,138 square miles is public land, and public lands belong to all U.S. citizens. If the department tells nonresident sportsmen that they cannot hunt on these lands, it may hasten the move toward a public use fee for resident and nonresident alike and jeopardize the state's right to manage resident game species on public lands.

. . . If the nonresident and $2.1 million-plus that he is paying for Montana hunting and fishing licenses annually were taken away, the operations and functions of the department would be crushed. Federal aid would also be lost. The only alternatives then would be to drastically increase resident hunting and fishing license fees and to cut down or eliminate such things as wildlife research, purchase of vital game ranges and fishing access areas, fish plants, game trapping and transplanting.

. . . If the estimated $20 to $23 million that nonresident hunters and fishermen contribute to Montana's economy annually is eliminated, what will happen to the people who depend upon nonresident trade for all or part of their livelihood?

Well, what do you think? Is there any value in allowing nonresident sportsmen to hunt and fish in Montana?

NEXT TIME

Watch for these features in the January/February 1972 issue.

. . . logging and elk

. . . ticks

. . . Lincoln Back Country

. . . large commercial land development in Montana

. . . the golden eagle

. . . slash burning

. . . Elmo State Recreation Area

. . . the hunter: why do we need him?

JERKY . . .

(continued from page 7)

The next day drain off juice. Grind fresh pepper over meat. Place on oven rack at 250 degrees, making sure you line the bottom of the oven with foil to catch all the drips. (Otherwise, you'll have a mess on your hands.) Leave meat for about five hours or until dry. (It may be dried up to eight hours but it becomes drier and more brittle than I like it.) Store in closed containers in a cool place.

Susanna Fliger
Billings, MT

OVEN-DRIED BEEF JERKY

Dr. McFeters sometimes passes this recipe along to his students, which is how we got hold of it. It can be made with either beef or game meat.

Trim all fat off 2 or 3 pounds of lean tip sirloin. Chill meat just about to freezing. Cut into long, thin slices across the grain. Lay the strips flat on foil and sprinkle the following ingredients to taste: salt, Lawry's Seasoned Salt, sugar, garlic powder. You might try using different amounts on different slices of meat to see what tastes best to you. It's better to have the seasoning too light than too heavy.

Rub both sides of meat with Wright's Liquid Smoke. Place meat in a bowl, sprinkle a little more liquid smoke over it, cover and refrigerate. Leave overnight to marinate.

Line the bottom of the oven with foil to catch drips. Place meat strips on oven rack to dry. It works best in a gas oven using only the pilot light. In an electric oven, turn on the lowest possible temperature. Leave the meat to dry until crisp clear through—keep sampling it periodically until it's right. This can take 1 to 3 days, depending on the thickness of the meat and the dryness desired. The meat must be very dry and have all fat trimmed off if it is to be preserved a long time without refrigeration. If it's a little moister, it must be refrigerated.

Dr. Gordon McFeters
Assistant Professor of Microbiology
Montana State University, Bozeman

SUGAR CURE OVEN JERKY

Although most recipes come from Fish and Game personnel or outdoors publications, this one is from a reader. Mr. Notti commented: "The main ingredients are meat of Montana big game and clean Montana water — so let's preserve them!"

2 quarts clean Montana water
1 egg
Morton's Sugar Cure
Meat from Montana big game, all fat removed

Fill container with 1 quart of water. Slowly add measured amounts of sugar cure while stirring to dissolve, adding until egg rises to the top of mixture. (Note amount of cure for future reference.) Remove egg and add second quart water. Soak long strips of meat (¾-inch thick) overnight at slightly below room temperature, stirring occasionally to fully expose meat. Drain and pat dry on old dish towels or flour sacks.

Place meat on oven racks so no two pieces touch. Line oven bottom with foil to catch juices. Warm oven to lowest temperature so it will dry meat—DO NOT COOK. Crack oven door to allow moisture to escape. Dry the meat until it becomes solid and appears dry after breaking, but not too dry. Slight streaks of white salt will appear. If too much cure was used, the meat will turn all white. Flavor may be spiced by adding pepper, garlic salt, garlic powder, etc., to the sugar cure.

This is a fine way to enjoy a tough or late season buck or bull or a strong pronghorn.

Benny A. Notti
Miles City, MT

TWO HOUR JERKY

Perhaps the easiest recipe of all comes from an article in FIELD AND STREAM.

Cut the meat into strips about ¼-inch thick. Tough cuts may be cut across the grain; tender portions should be stripped off or cut with the grain. Boil the meat strips for five minutes or so in the following solution to destroy any dangerous organisms and start the curing process (adequate for up to 10 pounds of meat): 2 quarts water, 1 cup (½ pint) vinegar, 2 cups salt and 2 tablespoons pepper.

Next, the strips are rolled flat with a rolling pin to remove excess brine and to flatten. (If the meat juices being pressed out are red, the meat has not boiled long enough.) The jerky at this point should have a gray-brown color and a somewhat rubbery texture. Lay the strips on the oven rack, allowing space between for air circulation. Set the oven on "warm" or 200 degrees and keep the oven door cracked to allow moisture to escape. Remove the meat when it is almost dry (after about 1 and ½ hours). The strips should crack but not break when bent.

Lay the strips out for final seasoning. Paint both sides with A-1 Sauce. The dry meat soaks up the sauce in seconds. For hotter flavor, add Worcestershire Sauce or Tabasco. Or try a mixture of ketchup and vinegar. For more flavor, paint the meat again. The finished product can be stored in fruit jars or plastic sacks, and if kept dry, should last for years.

FIELD AND STREAM (October 1971)
Norman Weis and Jim Howard

to answer your question

by Frank H. Dunkle

EDITOR'S NOTE—The department receives many letters and other inquiries each year requesting our position on various controversial topics. In the following article, Director Frank H. Dunkle answers five of the most common queries for our readers.

Q What business, if any, does the Fish and Game Department have with air pollution?

A Wild animals breathe too.

The law specifically spells out the department's responsibility for the well-being of wildlife. In recent history, air pollution has caused problems for deer, and this is definitely our business. In other cases air pollution might indirectly harm wildlife by destroying vital food plants.

In a broad context, pollution affects all men and all wildlife. For this reason we have a basic concern for abating every source of pollution of water, land, and air, even though the effects on fish and wildlife aren't necessarily direct. Environmental degradation in any form adds to the overall stress on populations.

Pollution is a matter of attitude. Once industrial attitudes adjust from simply "getting by" environmental standards to doing the cleanest job possible, both man and wildlife can enjoy a quality environment.

Q Is land reclamation after strip mining really possible and practical?

A It isn't known right now whether all Montana areas can be successfully reclaimed after strip mining. In-depth evaluations of present reclamation practices will have to be made before their effects on wildlife, ranching, farming and other land uses will really be known. The problem is that mining is expanding faster than its impact can be understood.

States with stringent laws and effective enforcement, such as Pennsylvania, generally feel that successful reclamation is possible. For Montana to learn the needed answers and techniques, there must be cooperative efforts by both mining companies and state agencies with a legitimate interest in reclamation. We feel Fish and Game is one of those agencies since wildlife depends upon the land. Healthy wildlife populations reflect productive land and are a measure of the success or failure of surface mined land reclamation programs.

We are currently working out a cooperative research program with Consolidation Coal for Montana's Bull Mountains. The program is designed to provide information necessary for accomplishing acceptable reclamation compatible with wildlife needs and to protect the valuable ranching industry of the area.

The goal of reclamation is to leave land so that it can be used again for things of ultimate benefit to people (e.g. wildlife, agriculture and livestock). Since the land base is fixed, multiple use is the only way we can get the most from what we have. Successful reclamation is necessary to maintain the maximum amount of productive land for wildlife or anything else.

Q When deciding uses of Montana water, how much consideration should be given to fish and recreation?

A We believe that minimum flows should be maintained in Montana streams. These flows can be used for domestic, industrial and power activities as well as fish and recreation only if the used water is returned to the stream in the same condition as it was when extracted.

Large main stream dams aren't necessary to fulfill water needs. Smaller dams constructed at a number of sites in the same drainage are only a little more trouble and expense but they give the same result. Smaller dams off main streams don't ruin vast areas of valuable and productive river bottom for other uses.

In discussing water use, it's important to recognize the difference between water use and water consumption. Irrigation is the only significantly consumptive Montana water use. Industrial, recreational, domestic and power uses of water are largely nonconsumptive because they leave the water available for further use. Fish and recreation are the least consumptive.

Viewed in the large context, all of Montana's water is being used right now. This multiple use base is the best defense of our right to use water originating in Montana. For example, if irrigation is the only use, only irrigators can defend it; but if all of us are involved in the true multiple use of water, we are less vulnerable to claims by downstream states. Our problem is to balance consumptive and nonconsumptive water uses to fill all needs, including fish and recreation. Water rights, in this respect, have a similarity to ecosystems, which become more stable as they become more diverse.

Q Can Montana have an increased industrial use of our natural resources and still maintain a quality environment?

A Past history might indicate that a state must choose between industry and environment. This is not true. Compatibility between industry and quality environment depends on knowing beforehand how to handle each resource use. Today the selection must be made between resource uses that are, at this time, harmless to the environment and those that degrade it. This requires adequate information to make accurate value judgments. Such information can only be obtained through well-designed preliminary resource inventories, including studies of the fish and wildlife resource.

This is exactly what the department and the Anaconda Company are trying to do at Lincoln, Mont. We are studying the ecology of the area for the purpose of designing a mineral development that will have minimum impact on fish and wildlife populations. If successful, the Lincoln project will be the first time the horse was put before the cart instead of behind it.

Montana must remain a healthy land body rather than becoming the subject of a future postmortem. Lincoln is a bold experiment. It should be expanded to include community as well as fish and wildlife planning. If it works, Montana will have progressed a long way toward the goal of keeping the environment healthy both for wildlife and industry.

Q Some critics charge that the Fish and Game Department is more interested in wildlife than people. Is wildlife to be kept plentiful at the expense of people making a living?

A Montana law, which reflects the wishes of most Montanans, is very specifiic about our responsibilities to wildlife. Obviously, we must be interested in people because of the environmental relationships between Montanans and their fish and game resources. The quantity of our wildlife populations is an indicator of the quality of the environment that sustains both wildlife and man.

The environmental short-cuts taken by resource users in the past to increase their efficiency have left visible damage to our resources. Our wildlife resource offers evidence of this damage. These short-cuts—which, by the way, often mean cuts in manpower—are no longer acceptable to the public. Damaged land must be restored, dirty waters must be cleaned and smokestack effluents purified—for the sake of both man and wildlife.

These actions take time, money, labor, technicians and plenty of know-how. Approached with a will, environmental restoration might become Montana's fastest growing industry, creating rather than eliminating jobs in the process. The idea is to create benefits, not hardships, for people.

(For more of Frank H. Dunkle's views, turn to his regular message on page 41.)

dear F&G

A RIVER GOES DRY

As a recent resident of the Jocko Valley, I am appalled to see what in my opinion is gross mismanagement of the water resources of the area.

The entire Jocko River for several miles has been diverted into an irrigation system which allows unused water to flow over roads because of overfull ditches. Ditched water also runs through untended farmlands and timber areas while the riverbed remains bone dry. I have seen dead trout measuring around 18 inches in length lying rotten in the dry bed.

I would assume that the entire ecology of the area is being greatly damaged, not only the fish and other aquatic animals, but those birds, mammals and plants in the system too. Also, shortly after the river went dry hordes of insects invaded the area, making life miserable.

Does the law now permit disastrous misuse such as this? If so, then I feel it is time to change the law. Legislation should be enacted to protect our natural resources and preserve wildlife.

I know and understand that the farmers of the area need water for irrigation purposes, but they are taking all the water from the river and not using all they are taking. A tremendous amount of water is being wasted and a substantial amount of wildlife is dying needlessly.

Hal Hibbert
Arlee, MT

• *The practice of dewatering streams for irrigation as you've described above is not against Montana's water law. In fact, the law sometimes tends to encourage such activity.*

In past legislative sessions, the Fish and Game Department has supported legislation that would grant water rights to fish and wildlife. However, the proposals never meet the approval of enough of our state senators and representatives.

The Montana Water Resources Board administers the present law. You might want to write to them and ask for their feelings on the matter.

Watch future issues of MONTANA OUTDOORS for an article on dewatering and irrigation and its effect on fish and wildlife.

NEW DUST COVER

I was quite pleased with the dust cover on the latest issue of MONTANA OUTDOORS. This is indeed an improvement to your magazine. Too often the copies would be received with the cover damaged due to handling within the postal department. With the beautiful pictures on front and back, one is now able to enjoy them unsmudged.

The most important aspect, however, is that you used 100 per cent recycled paper in making the cover. It is nice to see the conservation agencies practicing what they preach. Indeed you are to be commended.

Kenny A. Weekes
Bismark, ND

YOU CAN EVEN MAKE A BLOTTER

Congratulations on your recycled dust cover.

After using it to write a blistering column on, I reclaimed it to wipe up some spilled coffee then recycled it again for a blotter—this one, in fact.

Great magazine. Keep up the good work.

Ecologically yours,
Les Rickey, Sports Editor
Daily Inter Lake
Kalispell, MT

NEW TOWING DEVICE

After a great deal of research and drawing . . . I have come up with a device which allows me to tow my car behind my travel home. Previously, I spent half my time trying to turn around or back up, which was nigh to impossible with a tow bar.

I have accomplished "Easy Tow" by simply raising the front of my car four inches off the road (you must not tow an automatic shift car with all four wheels on the road). Just as the tow trucks do, I pull only on the two back wheels. I can turn as sharply as I wish, back up under control, much safer than with any tow bar made.

As my product is not for sale, but I would like to help others in any way I can to solve their towing problems, I offer any advice I could give. My time is not valuable—I will gladly do this just for the asking, no obligation.

A good welder can make "Easy Tow" in six hours. If anyone is interested, write:

Howard Liston
Box 265
Big Fork, MT 59911
Winter address:
Box 114
Bullhead City, AZ 86430

wildfires and wildlife

artwork by Vern Craig

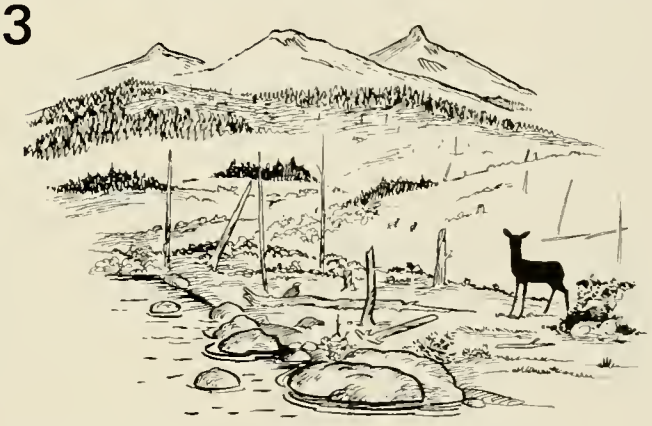
1

Mature forests have little understory vegetation which serves as winter food for big game.

2

Wildfire can completely destroy a mature forest.

3



The land is then opened to sunlight. Shrubs, forbs and grasses grow and provide excellent game food and habitat.

4

As years pass, trees again began to dominate the plant community.

5

When the forest again matures, valuable game foods disappear and the area will support only a fraction of the game it did during the years following the wildfire.

Fire fighting on the Trapper Creek fire of 1967. (*Photo courtesy of U.S. Forest Service*)

fires, forests and

(below) The Trapper Peak fire at sunset.
(U.S. Forest Service photo by Dave Jarrell)

Natural plant succession and modern fire control methods are slowly destroying prime winter game ranges created by uncontrolled wildfire.

fauna

by reuel janson

THE scars of early day wildfires that destroyed millions of acres of forest have become valuable game ranges for elk, deer and other species. Unfortunately, these ranges are now growing back to timber and are losing their value to wildlife.

This is a serious problem, because modern fire fighting methods have virtually eliminated the massive wildfires that create natural game ranges. New ranges are still formed by forest fires, but on a much more limited basis than in the past.

Without adequate winter range, many species of wildlife cannot survive. Therefore, the development of game ranges through such techniques as controlled burning has become an important tool in the management of huntable game populations.

EARLY EXPLORATION

The importance of open wildlife range is documented by the records of explorers who traveled through western Montana and northern Idaho. In these heavily forested areas big game was very scarce. The Lewis and Clark Expedition, for example, spent a month in the Clearwater River area in Idaho and did not kill a single elk.

Other explorers had the same experience. David Thompson, Ross Cox, Alexander Ross and W. A. Ferris journeyed through the area which now embraces Lincoln, Sanders and Mineral Counties in Montana as well as nearby portions of Idaho and Washington during the period 1800-1830. Their journals do not mention elk in this area except for one "red deer" killed on the Moyie River in Idaho by David Thompson's party. Even deer were not sufficiently abundant to furnish a dependable food supply, and many explorers and fur traders were forced to supplement their diets with moss bread and horse meat.

A notable exception to the reported scarcity of game was the Alexander Ross fur trapping expedition which traveled up the Clark Fork and Bitterroot Rivers during the winter of 1823-24. Apparently, big game animals were concentrated on winter range in the narrow valleys along the route traveled by the expedition. The procession of 144 men, women and children and 392 horses subsisted entirely off the country. The first few days of the journey everybody shot at game (presumably white-tailed deer) and used up ammunition at such a prodigal rate that Ross sent out four hunters ahead of the party and prohibited shooting by anyone else.

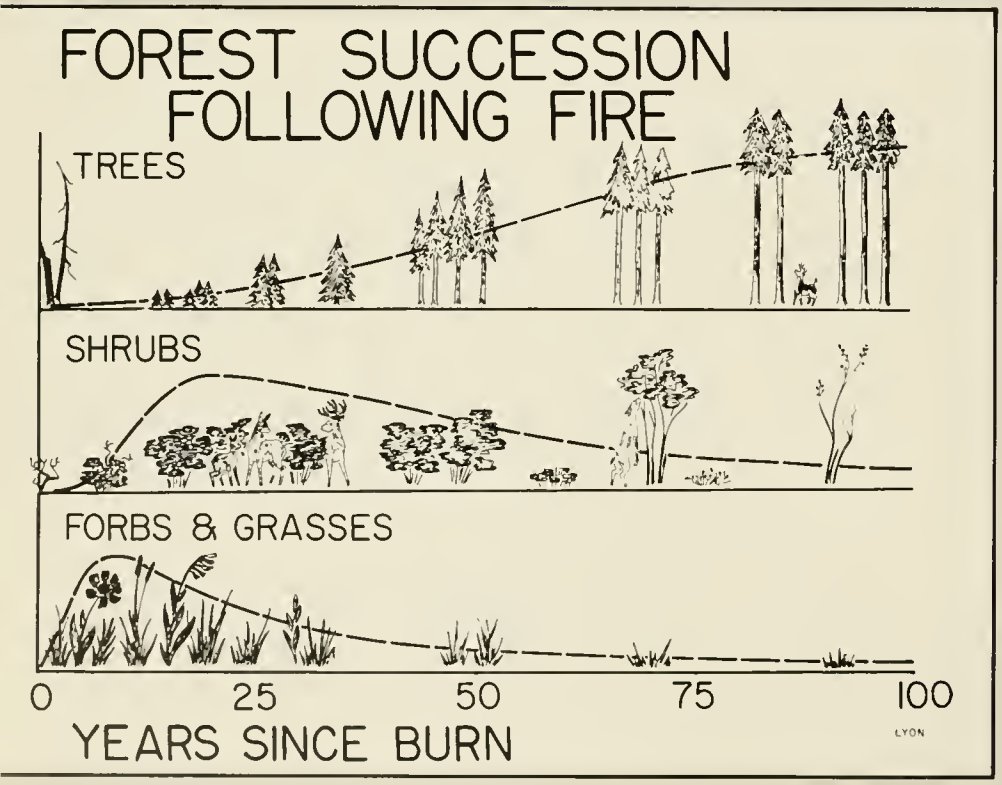
The contrast in game numbers found by Alexander Ross as compared with other parties suggests that the seasonal migra-

fires . . .

tory habits of big game animals in western Montana were the same 150 years ago as they are now. During the winter they were located on winter range in the narrow valleys and were easy to find. In the summer, they scattered in the mountains and were seldom seen.

Another valley that contained abundant game was the Deer Lodge Valley. Here in 1853 John Mullan reported large numbers of antelope, with mountain sheep and goats in the surrounding mountains. However, nowhere in western Montana was there game to compare with the tremendous herds on the plains and foothills east of the Rocky Mountains. Then, as now, game animals were dependent on open areas for food and did not thrive under a heavy forest canopy.

The graph below shows how natural plant succession following forest fires gradually destroys habitat and food supplies needed by big game and other non-game wildlife. (*Courtesy of U.S. Forest Service*)



Many species of wildlife benefit from forest openings. Besides big game, such animals as rabbits and hares, most rodents, most carnivores and many birds utilize open range. Only a few species, such as the woodland caribou, prefer the climax or mature forest.

CHANGED CONDITIONS

How have game numbers responded to changed conditions since the period of exploration? At first, settlement of the valleys led to a scarcity of deer and elk. The animals were confined to the mountains or other remote areas, and the combination of this restricted range plus unrestricted hunting caused a decline in both deer and elk populations.

Fortunately for the game, the miners, loggers and settlers were careless with fire and did not have effective fire control equipment. As a result, large areas were swept with wildfires, some of the worst occurring in 1889, 1910, 1919 and 1934. Gradually, on the many thousands of acres laid waste by fire, palatable grasses, sedges, forbs and browse plants developed. This created a forage bonanza for deer and elk on both summer and winter ranges.

With protection from hunting beginning about 1910, game populations expanded to fill the newly created ranges. The Clearwater drainage in Idaho, where Lewis and Clark once spent a month without killing an elk, became the locale of one of the largest elk herds in the nation. The South Fork of the Flathead drainage supported one of the largest huntable elk herds in Montana during a period when elk were scarce in many other areas. Hunting District 22 in Mineral County, where no elk were reported by early travelers, produced the densest elk harvest in 1961 of any hunting district in Montana—1.6 per square mile.

Deer and elk numbers probably reached a peak on some western Montana ranges prior to 1940. They maintained a high population in most areas until nearly 1960 before a noticeable decline occurred. The primary cause of the decline was a reduction in forage, particularly on winter ranges. It could be argued that liberal hunting seasons reduced the herds. This may be true, but reduction by hunting was only a secondary cause. Hunter harvest, in fact, was needed because of the animals' dwindling food supply. According to Fish and Game Department records, more deer died of malnutrition in the 20 years between 1935 and 1955 than were killed by hunters. Heavy winter losses of elk also occurred in some areas, particularly in the South Fork of the Flathead.

Three natural processes collaborate with each other to reduce the food supply. One of these is overuse and depletion of forage plants on winter ranges by the animals themselves. This

was prevalent before hunting regulations were made more liberal. Another factor is the tendency of tall browse plants to grow out of reach of the animals. This is a serious problem on the Clearwater elk range in Idaho. The third, and most far-reaching, is nature's relentless process called "plant succession," which gradually replaces the grasses, forbs and shrubs with coniferous timber. Unless this process is occasionally interrupted, many game ranges and the animals that depend on them are doomed.

Wildfire, in early times, was the chief agent which interrupted plant succession and maintained or created the necessary openings in the forest canopy. Today wildlife is too hazardous and wasteful; hence it is quickly subdued by efficient control methods. As a result, the game ranges which were created by forest fires 35 to 80 years ago are being lost under a canopy of trees.

When used carefully and correctly, controlled burns can create valuable wildlife habitat. (Photo courtesy of U.S. Forest Service)

Montana elk populations have slowly decreased as plant succession reclaims wintering grounds. (F&G photo by Gus Wolfe)

CONTROLLED BURNING

If huntable deer and elk populations are to be maintained in forest climax areas, game ranges that are being lost naturally must be replaced artificially. One method of doing this is controlled burning.

The U.S. Forest Service and the Idaho Fish and Game Department are cooperating in a spring burning project in the Clearwater drainage, where many of the palatable browse plants such as willow, serviceberry and maple have grown out of reach of elk. There is a good understory of bracken fern and other herbaceous vegetation which burns readily during dry weather in the spring. This vegetation is ignited at the base of west or south-facing slopes and the fire runs to the top of the ridge where it usually goes out because of moister conditions on east and north slopes and the

adverse downhill grade. (Forest fires don't burn as readily downhill as they do uphill.)

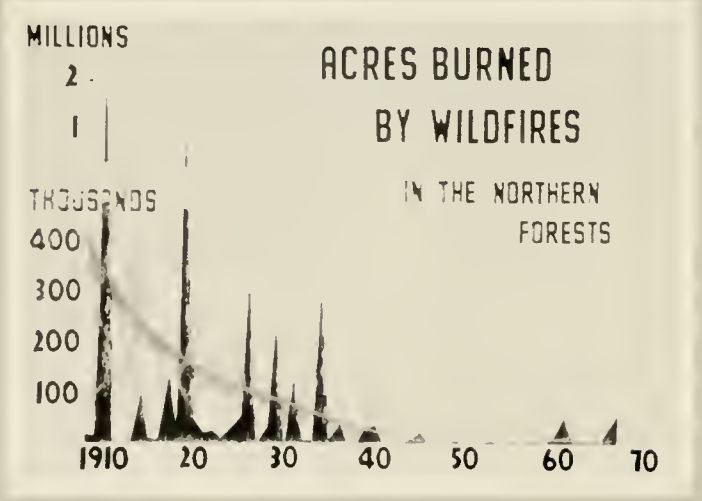
Spring burning is relatively safe and allows new browse shoots to grow several feet before elk come down onto the range in the winter. This method has been tried to a limited extent in northwestern Montana, but there are fewer areas suited to this type of treatment than in northern Idaho.

Some other methods of preserving or maintaining winter ranges have been tried. These include mechanical removal of young conifers or tall brush, spraying unwanted vegetation with chemicals, and seeding unproductive areas with palatable species of vegetation. All of these methods are too expensive and too limited in application to be effective. Spraying with chemicals also may have undesirable biological or ecological effects. The herbicides 2,4,5-T and 2,4-D are toxic to fish and contain teratogenic substances which produce birth defects in animals. These chemicals also kill some valuable browse species, such as redstem ceanothus, which are more sensitive to the spray than some unpalatable species, such as ninebark.

Although burning is one of the most promising methods, it does not always improve game range. Sometimes removal of the forest canopy destroys game habitat. Coniferous cover often allows deer and elk to winter in "snow belts" if there is an understory of forage plants under the trees. The tree canopy intercepts much of the snowfall so that there is less snow under the trees than in the open. Removal of the timber destroys both the sheltering canopy and the understory food plants, so that animals can no longer winter there.

The dependence of deer and elk on conifers for winter range during deep snow periods can be observed in many places. During the heavy snow winter of 1968-69, deer and elk were confined to timber cover for at least two months in the portion of Clark Fork drainage in the Superior-St. Regis area. Aerial and ground surveys of this area in late winter revealed abundant game tracks in timbered areas of the winter range zone, but an almost total absence of tracks in openings, either natural or man made.

Thus, timber removal by fire affects different areas in different ways. In some areas it creates winter range, in others it destroys it. This points out the need for judicious planning to provide winter range where it is needed, and to keep from destroying it where it already exists.



As this graph shows, wildfire cleared millions of acres early in this century. In recent decades, modern control measures have prevented this natural creation of winter game ranges. The ranges formed in early times have now reforested and have lost much of their value to wildlife. (Courtesy of U.S. Forest Service)

THE FUTURE

What of the future? It is known that burning in certain areas will create productive game range, and that it is one of the only methods that will produce the desired result economically and efficiently. At the same time air pollution control is becoming stricter and burning may eventually be outlawed. If this should happen, a very valuable wildlife management tool will be lost.

Foresters have long recognized the value of controlled fire for timber management. Research forester Arthur E. Roe, speaking to the Missoula Chapter of the Society of American Foresters, said, "In reality, there are no alternatives for use of fire in vegetational management."

However, much information is still needed to adequately plan and then burn in such a way as to benefit wildlife rather than harm it. When the needed information becomes available, forest wildlife and its habitat can be managed much more efficiently for the benefit of both man and animal.

EDITOR'S NOTE: Before joining the Montana Fish and Game Department in 1955 as District Game Manager in Great Falls, Reuel G. Janson served as game biologist for the South Dakota Department of Game, Fish and Parks. Janson, 54, is now the department's District Game Manager in Missoula. He received a Bachelor of Science degree in wildlife management from Utah State University, Logan, in 1940, and a Master of Science degree in the same field in 1946. He is a member of the Wilderness and Wildlife Societies, and is currently participating in an elk-logging study that involves the department and five other state and federal agencies.

OUR BUSINESS

THE settlement of the North American continent was based on the premise that man had to conquer the wilderness and control the forces of nature.

Since then, we have learned over and over, and sometimes very painfully, that our natural resources are finite and that the "rape and take" philosophy results in small, shortsighted gains and everlasting, unrestorable losses. We can no longer afford to compete for the extraction and use of natural resources at the expense of our land and water, which are essential ingredients in our environment.

Wildlife, a product of the land, has suffered from land misuse. Presently, environmental pollution and habitat destruction pose the greatest threats to our wildlife resources.

By its very nature, Montana is an extractive state (resources are extracted from the land and exported.) No huge "hard" industrial complexes exist here to concentrate pollution. Basic resources—minerals, agriculture, livestock, forests and water—maintain a sound economy for our state. These resources provide jobs for our people and money for our economy. Most of our grain, minerals, timber and livestock go out of state for final processing into consumer products.

The vast blanket of low-sulphur coal lying under southeastern Montana is one resource that simply cannot be thoughtlessly exploited. This immensely rich resource will certainly be developed, and it should be. However, a sincere concern for the environment must accompany its unearthing. After the coal is gone, the land must be reclaimed for grazing, farming and wildlife. Our wild creatures are as much a product of the land as wheat, corn, timber and grass.

Like the land, our water must be managed in a truly multiple sense. Industry, irrigation, recreation and fish and wildlife all have legitimate rights to Montana's water. Furthermore, they can all be compatible with proper planning and foresight. Without forethought, results can be—and have been —disastrous. Fish and wildlife are common losers in poorly planned commercial water developments.

Considerable damage results from industry-environment clashes—loggers fighting preservationists, industry fighting conservationists and polluters fighting environmentalists. A collective and cooperative approach would solve most problems without creating additional ones. The intelligent use and sound management of Montana's natural resources require cooperation from everyone.

The department has promoted this approach to conservation for two years. It has caused us unforeseen problems. Because of this promotion, I have been accused of overlapping in affairs that some people feel are none of my business . . . of exceeding areas of responsibility germane to fish and game resource management . . . of emotionalism . . . and of purposely stirring up the public. I hope these accusations are true. For that, in my opinion, is what it's all about.

It is essential that I overlap, for that's what ecology is—an overlapping of sciences. Although a more appropriate word is intertwining, I will never deny overlapping. I am concerned about water pollution and land abuse because the land and the water produce and support our valuable renewable resource, fish and wildlife. And that's what it's all about.

In today's society, there are no bystanders. You are either part of the problem or part of the solution. Too often we have heard, "What can I do, the problem is so immense, I am only one."

But you are one (or the other), aren't you?

Frank H. Dunkle

FRANK H. DUNKLE

(For more of Frank H. Dunkle's views on topics that seem "unrelated" to fish and game management, turn to page 32.)